SUPPLEMENT.

The Mining Journal,

RAILWAY AND COMMERCIAL GAZETTE:

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

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Original Correspondence.

EXPLOSIVES USED IN BLASTING.

SIR,—I have read with interest Mr. Waddington's several communications to the Journal on the advantages derived in mining operations from the use of machinery in rock drilling, and dynamite as an explosive. There can be no doubt that many valuable mines have been abandoned after being worked for years by the old process of hand drilling and blasting with gunpowder, which would have proved a great success if the more rapid and economical process of drilling by machinery, and blasting with more powerful explosives, whether dynamite or gun-cotton, had been resorted to. It is said that "time is money," and this is peculiarly so in mining operations, where continued delay not only occasions a loss of interest, but exhausts the patience and energies of the proprietors. The present success of the St. John del Rey Mine is attributable to the use of dynamite, for if the old process of blasting with gunpowder had been continued the shafts would not yet have been completed, and numerous other instances of rapid development by the use of dynamite have been communicated to me.

Mr. Waddington, in his letter on explosives, which appeared in the Supplement to last week's Journal, has fallen into an error in his comparison of the explosive force of nitro-glycerine and dynamite, the former of which he estimates at 100, and the latter at 60, or less. The correct comparative force of the three explosives, nitro-glycerine, dynamite, and gun-cotton, is as follows:—

Nitro-glycerine	1·00
Dynamite	·72
Gun-cotton	·69

The whole of the dynamite now in use in this country is manufactured by the British Dynamite Company (Limited) under Mr. Nobel's patent and his general supervision, and does not, as Mr. Waddington appears to suppose, vary either in the quantity or quality of the nitro-glycerine it contains. It is all manufactured at the works at Ardeer. The strength and quality of the nitro-glycerine are uniform, and the quantity exactly 75 per cent. by weight of every ounce of dynamite. I have had great experience in the use, storage, and transport of both nitro-glycerine and dynamite, and, perhaps, greater than any other person in the kingdom of nitro-glycerine, having been for many years the sole importer and dealer in it, and I regret to say I cannot concur in Mr. Waddington's conclusions as to its safety. Being of an oily character it is almost impossible to prevent exudation from the vessel in which it is contained during transportation, more especially as it contracts and expands with variation of temperature. This exudation is a source of great danger, and has caused numerous most serious accidents. An elaborate and very able and well considered article on "Dynamite" appears in the *Times* of this day, in which the writer says—"In handling liquid nitro-glycerine the miner was dealing with one of the most treacherous explosive substances known to the chemist," and in this I entirely agree.

No doubt, "if intelligent caution is exercised," as Mr. Waddington suggests, the danger is greatly diminished and comparatively small; but most assuredly this "intelligent caution" is not met with amongst the mass of our miners, who, on the contrary, are notoriously reckless of danger in the use of explosives. To compare the safety of nitro-glycerine to dynamite is quite out of the question. I have quoted from the article in to-day's *Times* the writer's opinion of nitro-glycerine, and in the same article he says—"Dynamite when carefully manufactured undoubtedly constitutes one of the safest, most powerful, and most convenient explosive agents applicable to industrious purposes," and unquestionably this is so. We know also that this is the opinion of Prof. Abel, as recorded in his published lecture delivered on May 14, 1872, before the Institute of Civil Engineers. For practical purposes I consider dynamite far preferable to nitro-glycerine. What the former loses in power is more than gained in its adaptability to all blasting operations, and the easy control which is exercised over it. Nitro-glycerine, on the other hand, when once parted with cannot be recovered, and when poured into a bore-hole occasionally escapes through fissures or cracks in the rock, and becomes a source of great danger, being met with again where least expected.

The explosive force of dynamite and guncotton is very nearly the same, and for many purposes they may be considered of equal value, but there can be no doubt that dynamite has two great advantages over guncotton for use in mines. The disc of guncotton is rigid, and if it meets with any obstruction in the bore-hole, either from diminished diameter as it descends or otherwise, and the miner attempts to force the guncotton down, it explodes and kills or maimes him, and although miners know this yet they will apply force, and court death. Dynamite on the other hand being a soft and plastic paste, confined in a paper covering or cartridge, may be forced down the bore-hole with impunity and perfect safety. Again, guncotton cannot be used without great difficulty in damp ground, or water-bleeding rock, while dynamite can be freely used in either, and appears, indeed, to fire better and be more effective under water than in dry ground.

ORLANDO WEBB.

Belmont, Bangor, March 29.

COAL CUTTING BY MACHINERY.

SIR,—The Monitor Coal-Cutter, described in the Supplement to last week's Journal as being in use at the Coal Brook Mine, in America, certainly appears likely to facilitate the undercutting of coal without damaging so many inches of coal as most others, and the system of pulling the cutters round by the periphery of the carrier, instead of turning them from the centre, is thought to be a decided improvement, and that it must do a given amount of work with considerably less power. The circular saw principle was introduced for coal cutting, when coal cutting by machinery was quite in its infancy, by, I think, Mr. Simpson, and was tested in the North of England, but although, from the smaller width of the saw, the undercut was narrower, it could not compete with the pick machine, because the saw reduced the whole of the coal it touched to powder, whilst the pick chipped off the coal, producing comparatively little dust, and, consequently, allowing of a much larger proportion of large coal being brought to market. I am aware that Mr. Rothery, who was one of the earliest inventors of coal-cutting machines, abandoned the pick system for a peculiar and ingenious form of chain saw which he invented, but I never heard of the invention having been successfully applied, and it was said that he had reverted to the pick machine as the more economic system. Messrs. Firth, of Leeds, without whose enterprise and capital neither Mr. Rothery's nor any other of the early machines would ever have got beyond the embryo state, have always advocated the pick machine, and I believe their success has exceeded that of any other maker.

Mr. Horace Brown's invention does not appear to display that originality and skill usually observable in American inventions, but there are several points worthy of imitation. The use of vertical and horizontal rollers for carrying and guiding the machine whilst at work is excellent, since it brings the bed of the carriage down to within a few inches of the rail-tops, but, this being done, there is no valid reason why the greater part of the machine should not be turned upside down, so as to bring the cutter-wheel down to within an inch of the floor level. This would reduce the waste of coal, and increase the value of the machine. The Hurd and Simpson machine was intended to make a deep cut without requiring the use of a large saw, but the arrangement used is anything but ingenious, and, although I have never seen it in use, I should expect that it is very liable to get out of order. The Monitor Cutter is less complicated than the Hurd and Simpson, but the principle is similar, but it is absurd to say that the power is applied at the point of resistance in either machine, and it is a very great question whether with a given power any more work can be done by pulling round the cutter-wheel by the periphery, instead of turning it from the axle with a crank, it has not been found economic to apply the power at the periphery of the driving-wheels of locomotives.

There can be no doubt that Messrs. Niblock, Zimmerman, and Alexander are to be congratulated if they can get an increased profit from the use of the machine, but the hewers at Coal Brook Mine, No. 3, must be very fresh hands if they reduce 16 tons of coal to slack in undercutting 100 tons of coal in a 4-ft. seam, for, of course, in breaking down and filling the waste would be the same whether the undercutting were done by hand or by machine. It is just possible that 16 tons may be knocked away in undercutting 100 tons in the seam referred to, but, certainly, four-fifths of this would be saleable as round coal or, at least, as nuts, so that if the machine wastes 3 tons in undercutting it would only show a saving of 2 cwts. in 100 tons, as compared with hand labour, and 2 cwts. at $2·25 per ton would be but 22½ cents, instead of $29·33 as Mr. Alexander states. His note shows that they have found modifications necessary, and I am not surprised at it; many more will also have to be made before the machine will prove a permanent practical success. It is mentioned that the capacity of the machine has now been brought up to 80 tons per 10-hour shift, but I would much like to know whether 1600 tons have been worked in any one calendar month by one machine; this is only allowing 20 shifts of 10 hours each at the speed mentioned. In coal cutting, as in all other mechanical work, the estimate should be based on the average of at least a month's working, and not upon a calculation from the rate at which the work has progressed for a few hours.

Considering what had already been done in the same direction, it is strange that four years should have been consumed in experiments to bring the Monitor to its present state, though the "decidedly unique devices," referred to by Mr. Alexander, may afford the explanation. The double cutters, for permitting working in both directions, is an unnecessary complication. The necessity to cut in both directions seldom arises, and can then be more economically done by arranging to turn the machine or the saw than by using some 50 centre pins, and the same number of rocking cutter-holders and screws. By cutting in one direction only, and using one of the many moveable teeth-saw systems well known in America, the first cost of the machine would be much reduced, and the cost of keeping it in working order would also be less. The use of chrome steel is an undoubted advantage, but the same material could be used with equal advantage with other coal cutters. As to one man following the machine being able to take down and load 10 tons in 10 hours in a 4-ft. seam, I think he must be above an average workman, and would be well worth the $4 per day which it is proposed to give them. It would be interesting to learn the opinion of the leading English inventors of coal cutters—Mr. Firth, Mr. Rothery, Mr. Clapp, and others—upon the merits of the Monitor, which, in my opinion, is quite as unlikely to work economically as that which consisted of a row of augers placed in a frame. Mr. Alexander is quite justified in saying that machines of this class will not lessen the employment available for working colliers, and it certainly will not lower the rate of wages.—*March* 31. A. THOMAS.

COLLIERY WORKING—BALANCED HOISTING ROPES.

SIR,—It seems to me that the engineers of the coal mining districts are guilty of a great oversight in hoisting a heavy weight merely to lower it again, without any benefit whatever. I allude to the heavy ropes used for hoisting the coal not being balanced. In every old coal mining district there is a large quantity of old rope, of no value except as old iron, which would make a perfect balance by attaching one end to the bottom of one cage, then passing down the shaft around a pulley under the landing place at the bottom, then up to the bottom of the other cage. What makes this oversight more mysterious is that when they hoist by a water balance the rope is balanced in this way. The advantage gained would be that a very small engine would do as much work as a large one, reducing first cost, as the engine would have only the coal to lift, whereas, now, the coal is only a small part of the load it has to start from the bottom. CORNISH ENGINEER.

Albert Mine, Albert County, New Brunswick.

AN OLIVE BRANCH TO SOUTH WALES.

SIR,—Another week of intense anxiety has been passed in the South Wales district. The loss to employers since the commencement of this sad disagreement has been enormous, and the sufferings of the workpeople have been as great, if not greater, than were ever before endured under similar circumstances in this kingdom. We know the employers fully estimate the serious responsibility they undertook when they determined that they had no alternative but to accept the position which brought about this crisis. Mistaken as the men may be, they have resisted their employers with a courage that has astonished us all, and has made us feel that they are men who are worthy of our respect, because not only of their endurance in a cause which they believe to be right, but likewise because of the peaceful manner in which they are carrying out their resistance. We cannot, however, forget that this is nothing more than a financial war—a financial civil war—in which the common cause of both combitants must suffer alike. When we consider it as a battle of endurance and sacrifice we are sick at heart that some means have not been devised to prevent so much waste of property and so much human pain. The primary object of employers and workmen is to work together in order to obtain price. Neither party can be benefited except by work. In their business relations nothing whatever can possibly serve them but employment, and this is the very thing they have destroyed. A month's idleness of capital is a month absolutely and finally lost to capitalists. Labour is the most perishable of all commodities; it must be sold on the day or it is permanently lost, for the day never returns. Some ingenious statistist may hereafter point out how much money has been lost during this Welsh strike. The sum will be so large that the workmen will scarcely understand the effect of the figures. They must be taught the magnitude of the result as children are taught sums in a dame school—that they represent as many sovereigns as would reach from, it may be, Merthyr to Bristol, or the like. Their own sufferings, and the sufferings of their wives and children, the poor misguided colliers will know too well. Many a master, too, will for the rest of his life feel in his dealings the force of this terrible beginning of 1875.

Unless the information which is available to us all is wholly misleading, both parties to this conflict in South Wales must be mortified by observing that there are districts adopting the simple expedient of arbitration to settle questions quite as large in amount, and, as appears to outsiders, quite as difficult as those which have arisen in South Wales without stopping work for a single day, without losing a single penny, or interrupting the kindly relations between employers and workmen. Of course, the South Wales colliery proprietors know their policy and their strength better than we can possibly know them. It may be they have seen, and do see, something against arbitration in their case which some other people do not. But this does not prevent the colliers in that district from being tantalised by the sight of relief almost within their reach, but which they are forbidden to hope for. If before recent examples in their own trade became patent the employers saw reasons to reject arbitration which the late satisfactory instances of its working have removed, we are quite sure no false pride, no desire of conquest, will prevent their reconsidering the men's offer to refer the whole subject to arbitration upon the masters' own terms.

Indeed, we are not quite sure, upon the perusal of Lord Aberdare's last letter, that the employers have not already practically, though informally, acceded to what the men thought a fair mode of determining or, more literally speaking, preventing this conflict. The masters have satisfied Lord Aberdare that their claim for a reduction is reasonable. They have done this by returns which they have submitted to his lordship from their business books. This is very much like satisfying an arbitrator of their own choosing. In Lord Aberdare's explanatory letter, in which he guards himself against being understood to have intimated that the masters were willing to have their profits taken into account, he has, as we think, and we trust intentionally, intimated that the masters might have no objection to some actuary taking out the figures from their books which had satisfied his lordship, and which it is fair to presume would satisfy the men, that the masters' demand for a reduction was, as a matter of business, just. If this be so—if we are right in what for extra precaution we will call the surmises we entertain, and have above expressed, we do not quite see how the masters can hesitate to do that which many thousands of people outside the South Wales coal field would be most grateful to them for doing. The owners have demonstated their vast power, and the men have been taugh t a lesson which they will never forget, and which it is fair to suppose will lead to the ability of the masters to henceforth carry on their business with less obstruction from those who ought to have in them more confidence than they have of late been displaying. Matters having now arrived at this pass would it not be the correct thing for the masters to build the golden bridge across which the men might walk to approach them with a flag of truce—if not, indeed, with the olive branch of peace? W. C.

ROCK DRILLS—YORKSHIRE VERSUS PRUSSIA.

SIR,—In the Supplement to last week's Journal, under the above heading, Sir G. W. Denys ridicules the manner of driving and heading as illustrated by the diagram in the *Mining Journal* of March 20. I am not presumptuous enough to say that it is superior to any other, and much less inclined am I to detract from a fellow Yorkshireman the credit due to him for having accomplished so much where so little had previously been done. I sent the illustration as a proof of what was being done in Prussia and Belgium and a dozen other places by machines. The diagrams showing the method of drilling practised in the Hoosac Tunnel do not appear to me to vary so much from the former diagram as I could wish if I were anxious to avoid the roar of laughter of a boy of 12. I remember the old proverb "He who laughs last laughs best," and will patiently await further criticism ere I either indulge in laughter or regret that my name is attached to the same. Sir George tells us he is doing the work of the four drills referred to by me for the month of January, when the progress of the machines did not amount to one-fourth of their monthly average, which was 12 to 13 fathoms. The comparison is unfair and partial. Again, Sir George say his strata consist of lime, marl bed, and at bottom 2 feet of hard grit. It requires little mining knowledge and less practical experience to know which is the most favourable place to work in; the one with two distinct cleavages in the forebreast, and the other hard jointy quartzite. Sir George breaks 1 fathom of ground by the consumption of dynamite amounting in value to 20s. 1½d., or (say) 10 lbs. at 2s. per lb. Whereas to blast 1 fathom in Fredrickseegen mines every metre cost 21s. 8d., or (say) 40s. per fathom, or 32 lbs. of dynamite at 1s. 3d. per lb. Of the comparative merits of Sir George's drill or the German drills I am unable to judge, never having seen the latter, neither am I convinced of any superiority of the drill or the miners from the letter of Sir Geo. Wm. Denys. Where such difference of conditions exists no fair comparison can be drawn from results. Three times the explosive force is used, and nearly three times the number of inches bored, to break 1 fathom of ground at the Fredrickseegen Mines. I, therefore, leave the merits of the two systems to the consideration of practicals. Sir George's system may be best for his mine, and the system at Fredrickseegen the best for theirs.

In the Hoosac Tunnel the system was to drill two series of five or six holes, about 9 ft. apart, and vary from 9 to 12 ft. in depth, each series converging towards the other. The holes from 1 to 11 being loaded are discharged simultaneously, and the drill carriages bearing the machines are advanced to the heading; the next series of 14 holes, numbered 12 to 25, are drilled, loaded, and discharged. The operation is repeated from 26 to 41. The effect of these three blasts was to advance the end 9 ft. in height, by its full width, 24 ft., making an average net advance of 7 ft. 6 in. of heading proper in 24 hours, It must not be understood that the Hoosac Tunnel is but 9 ft. in height. The above is the pioneer level, and other gangs of men are following on in the same manner until the full depth or height of 22 ft. is attained.

The cost in explosive was 2 to 3 lbs. of tri-nitroglycerine per cubic yard of rock in the headings, and from 6 to 12 ozs. per cubic yard at the bench work and stoping-out roof.

On reference to a small pamphlet, by Messrs. Dubois and François, on drilling-machines and manner of working, I find that in the St. Gothard Tunnel one large centre hole, about 3 in. in diameter, is put in horizontally, or nearly so; this frequently occupies eight or nine hours. This hole is surrounded by five others, each of which converge towards the centre hole, leaving the holes about 1 ft. apart at the extreme end. These holes are fired together, and out comes the cone. Probably Sir George Denys may condemn this plan as well as the former. With all deference for northern shrewdness, I do not think his system of mining would surpass in effect the results obtained either at Fredericksseegen, Hoosac Tunnel, or the St. Gothard.

I thank you, Mr. Editor, for kindly inserting the lengthy remarks on rock drills and explosives, and trust that others may contribute new ideas that may stimulate our mine managers onward in their efforts at cheaper production, and the better health of those employed. H. WADDINGTON.

47, *Threadneedle-street, E.C., March* 30.

BORING MACHINERY.

SIR,—"Who shall decide when doctors disagree?" and what but the actual trial of boring machinery can demonstrate whether it is to be a success or not? If successful, behold a new era in mining; if not, we may expect a despairing cry from Cornwall of mining. What can we do to save them and ourselves? If it be found that owing to some peculiarity in the nature of the rock, or some fault in the machines, or some prejudice on the part of the workers that the boring machine proves a failure, then we may expect to hear little of the machines for some years at least. Undoubtedly when our mines are extended by machinery more than an ordinary allowance must be made for deterioration, as the racking of boring in the hard granite will wear out the machines much faster than in limestone or any softer rock. I am sure Sir George Denys and Mr. Waddington deserve the thanks of all your readers for the interesting statistics given in last week's Journal, as facts form firm bases upon which to work; and whilst I have not a doubt that the system of boring, and the position and depth of the holes, were the best under the circumstances, yet I do not hesitate in saying that were the same systems adopted in our hard-ground mines of Cornwall the consequence would be a disastrous failure, and a very short inspection of the main features of the rock of which a hard tin lode is composed would, I doubt not, convince most people of this. As hard as adamant, tough as flint, and having no cleavage it is most troublesome and expensive to work—so much so that, as "Pedn-an-drea" says, only one hole can be put in at an advantage sometimes. The miner knows where the weak point of a rock is, and that by putting a hole in any fixed place a quantity of stuff can be blasted out. To blast a hole 4 or 5 ft. deep is what no miner does, and why? It is a fact that gases press equally on all points of contact, and when the explosion takes place there is not only an outward pressure but a pressure on all sides. If the seat of the explosion is far into the rock, the explosive being often too weak to lift out the mass of rock bodily, rushes out at the weakest point—the bore-hole—first forcing out the tamping, and then making its escape, with a result of a fine pyrotechnic display, and a great waste of material. This is especially the case with gunpowder. Dynamite is more powerful, but it has never been used extensively in Cornwall; it is expensive, nearly 2s. per pound, whilst gunpowder is only 5d., and it has not been found that the difference in power and effectiveness warrants the purchase of the more expensive. It is on account of this tendency of gases to make their escape at the weakest point that holes cannot be advantageously blasted when more than 2 ft. 6 in. deep, and I think Sir George Denys will bear me out in this. Dealing with ground which costs 10*l.* per fathom to drive has been found difficult, will it be possible to bore ground of 30*l.* per fathom at an advantage? Time, though only a short time, will doubtless show us. A. B.

SUCCESSFUL COPPER MINES—THE CAPE, &c.

SIR,—Now that the controversy between "Investor" and "Looker-On" as to the future of the Cape Copper Company appears to be closed, I should be much obliged to the latter if he would give us a short history of the mines which, in the Journal of Jan. 23, he names as having been equally successful at one time as the Cape Copper, and are now, as he says, in a very bad way—the Cobre Copper, Burra Burra, Devon Great Consols, Wheal Buller, Wheal Basset, &c.—so that it may be seen how far they resembled Cape Copper. I think

few of the shareholders or outside public are aware that we own 250,000 acres of freehold land, besides the mines, most of which is excellent grazing land, but will not bear heavy stocking.

AN OLD AND LARGE SHAREHOLDER
London, March 29. WHO HAS VISITED THE MINES.

COMPRESSED AIR ENGINES FOR TRAMWAYS.

SIR,—Although in England you will have to make some progress in legislation before air engines can be introduced there for the propulsion of tramway cars, a few observations upon what is being done in that direction elsewhere will not be uninteresting. Mr. Scott-Moncrieff patented some time since a very compact form of engine for use beneath tramways, and one of these engines with the necessary appurtenances having just been constructed by Messrs. James Howden and Co., of Glasgow, a public tral has been made and proved most successful. The directors of the Gla-gow and Vale of Clyde Tramways Companies were present, as well as a large number of engineers and scientific gentlemen, all of whom appeared well satisfied with the working of the machinery, although, of course, there were some little hitches, at all times inseparable from new inventions.

The substantial and finished character of the workmanship was evident, and the general design of the invention is unquestionably good. The engines are propelled by atmospheric air, which is pumped into six air tanks, and the whole are fitted into a frame, upon which it is intended to rest the car, the engines occupying the centre and the air tanks the spaces at each end. The floor of the car, the interior of which will be perfectly free from interference, will be about the same height from the ground as in the case of the ordinary omnibus. Besides the general arrangement, the essence of the invention consists in utilising the higher pressure by means of cut-off valves acted upon automatically by the diminishing pressure. The engines are worked by a hand lever, of which there is one at each end of the machine, so that it may always be worked from the end in the direction of which the car is going. The machine is provided with powerful brakes. The air for supplying the air tanks will be stored in large receivers stationed at allotted distances along each tramway route, and the process of pumping it from these into the tanks will occupy less than two minutes. The equivalent of 30-horse power can thus be obtained, and it is calculated that the machine will run without re-filling for a distance of 4 miles. Owing to the absence of any arrangements for providing the necessary pressure at the starting station the engine was worked at great disadvantage. The only pump procurable was found to be capable of filling the tanks to a pressure of only 200 lbs. to the square inch.

The tanks, however, have been tested up to a pressure of 500 lb., and the receivers, which will be alternately used, will easily fill them to a pressure of 400 lb. The portion of line on which the trial took place has never been used for traffic, and is consequently rather stiff, and the rain which fell in the afternoon had rendered the rails very slippery. In addition to this, the machinery being new, the valve gearing did not work so freely as it must do after more frequent use. But in spite of these disadvantages, the trial was considered a decided success. With only about half the pressure which will be obtained from the permanent receivers, the machine ran for a distance of about a mile, the maximum speed attained being about 12 miles an hour, but the engines being during the greater part of the trial only at half-speed. It was easily stopped within the space of its own length, when running at the rate of six miles an hour. The engines were also reversed, and the machine backed and started again with the greatest facility.

The adoption of this system of propulsion will, it is believed, prove much more economical than horse traction, but of this we shall have more conclusive evidence shortly, as the invention is, it is understood, to be forthwith put to work on the Vale of Clyde Tramway. It is mentioned that an incidental improvement resulting from the invention will be the doing away of the side entrances to the cars, which have proved a source of danger to passengers getting in and out, and the substituting of an entrance from the end where the splash-board now is, similar to the entrance in the common omnibus, but much more commodious. The circular staircase to the top will also be superseded, but the advisability of this would seem to be questionable, as a well-made circular staircase is, in my opinion, the most convenient means of access to the top that can be desired. The use of air removes the possibility of the smell and annoyance inseparable from steam-engines; and, although one will have to get accustomed to the constant puff beneath them arising from the escape of the compressed air at each stroke, there is really nothing to object to, whilst on the score of safety there need be no apprehension.—*Glasgow, March* 30. T. D. F.

DOUBTFUL MINERALS, DOUBLE NOMENCLATURE, &c.

SIR,—My critics are, some of them, hardly fair. Number seven takes an inverted position; for most certainly I have all along advocated the exactly opposite of what he accuses me. Indeed, I have no desire to introduce galenite, sphalerite, and chalcopyrite to the mineral market as substitutes for lead, zinc, and copper ores respectively. I thought I had written that large, in plain English, but it appears not. It is of very little consequence what my personal preference may happen to be as to the names of things; but, in ordinary and business conversation I am home-spun enough to prefer, for example, blue lead ore, white lead ore, red lead ore, green lead ore, and yellow lead ore, to galena, cerussite, minium, mimetesite, and wulfenite; and also, yellow copper ore, red copper ore, purple (or variegated) copper ore, green copper ore, blue copper ore, black copper ore, gray copper ore, indigo copper ore, velvet copper ore, and emerald copper ore, to chalcopyrite, cuprite, erubescite (or bornite), atacamite, lazulite, melaconite, tetrahedrite, covellite, lettsomite, and dioptase; and, unmistakeably, I prefer blende (or zinc-blende) to sphalerite. Likewise I prefer light-red silver ore, dark-red silver ore, black silver ore, ruby blende, vitreous silver ore, horn silver ore, green silver ore, steel-gray silver ore, yellow streak silver ore, selen silver ore, selen copper silver ore, to proustite, pyrargyrite, stephanite, miargyrite, argentite, chlorargyrite, embolite, freieslebenite, xanthocone, naumanite, and eucairite.

Further, I have not written anywhere that I prefer "sodic chloride" to anything else. I do not object to sodic chloride, chemically speaking. Excuse me, but I do not prefer London milkmen to vendors of the same article in the country. Neither do I prefer "lactic hydrate to milk-and-water. No, let it be chalked up plainly milk-and-water, and there will be no mistaking the diluted idea. Drinkers of alcohol and water sometimes dignify the admixture as "grog," or "toddy." Milk-and-water has escaped promotion in this way till now. My critic's idea is ingenious, and if I had a London "milk walk" I might be tempted to paint on my milk tins "lactic hydrate," and thus escape all magisterial fines and censure. Frankly, I am not "prepared to maintain" that "porcus ferrum" is "classic Latin." I knew better than that half-a-century ago. I heard a Glasgow warrant iron broker make use of the expression two or three years since, and I have done him wrong, perhaps, by the omission of inverted commas in my manuscript. It is a venial offence to send "dog-latin" after "pig-iron." To oblige my critic, I am inclined to insist upon it that "porcus ferrum" as "fairly represents the material" (well-known as pig-iron) as the expression pig-iron itself does; for dealers in Glasgow "pigs" have small affinity with "pig-dealers" proper, and buyers of pig-iron, when "operating," are seldom troubled with the idea of an old sow and a litter of pigs, from which the term originated. My critic's "ferric-pig" decidedly would not be "in the vernacular." Besides, I do not desire that everything should be in the vernacular. If "pig-iron" were a mineralogical expression, I should prefer its retention to any substitution, for the common-sense reason that everybody interested knows nearly what state of the material is meant thereby. Pig-iron, pig-lead, copper, regulus, and spelter have become conventional trade terms for metals in certain states approximately, so let them remain. But this hair-splitting scarcely advances the argument in hand. I mean as regards the present objectionable dual mineralogical nomenclature.

The nomenclature of inorganic chemistry is scientifically and, in most cases, appropriately constructed on the principle of making the prefixes and affixes of the words employed as far as possible significant of the nature of the substances for which they are used. Unfortunately, there are very few technical terms which will *precisely* call up vivid ideas of the things signified. It necessarily happens that all technical terms must, in the first instance, be conventional in meaning; but it is a *sine qua non* that, to be effective and appropriate, they should be so constructed as to present to the senses the most precise and full idea of the thing signified. Unless technical terms are associated *immediately* with the perception to which they belong, proper advantage is not derived from them, and in order that the memory may retain the sensation produced by an expression, the expression must become both distinct and familiar. There should be, therefore, neither vagueness nor inappropriateness in technical word-making.

Some of the following names of minerals fulfil, more or less, the required conditions:—Manganite, magnesite, magnetite, arsenopyrite, nickel glance; red, brown, lead, telluric, and cadmium ochre; pea iron ore, pearl spar, pitch blende, pitchy copper ore, copper pyrites, iron pyrites; radiated, spear, cockscomb, and nickeliferous pyrites; rock crystal, soap, and salt, rose iron glance, specular iron, satin spar, sodalite, arsenolite, bismuthite, cadmium ochre, calcite, clay ironstone, tellurium uran bismuth; stream, wood, and toad's-eye tin; vanadinite, selen sulphur, yttrocerite, and yttrotantalite. These names tell us something. Let them remain. I would say the same in favour of any and all of the existing appropriate names, and many others that are familiarly in use. My chief complaint is against foreign interference with my undoubted right, and what I think an appropriate desire to stick fast to old friends. T. A. R.
March 24.

A HARD-BOILED EASTER EGG.

SIR,—In these ultra High Church days, with the (at first) stealthy restoration of vestment after vestment, ceremony after ceremony, we are resuscitating obsolete and (one credulously supposed) utterly exploded customs, until we have now boldly re-habilitated the R.C. absurdity of the Easter Egg. Now, I have no earthly objection to eggs *as* eggs, especially if garnished with a choice bit of Cumberland just faintly impregnated with smoke of oak, but I do object strongly to the miserable mummeries of sacerdotalism.

I, therefore, wish to describe to you the sort of Easter eggs I and a party of choice spirits chose to seek in the picturesque land of Snowdonia. You, of all men, do not want to be told how, in the innermost crucible of "the round world and all that therein is," the metals, more or less precious, were fused millions or myriads of years ago; nor how when the god Steam could not find sufficient elbow-room he burst through the surrounding crust, and hurled up in his mighty wrath Heclas and Etnas by the score as vents to his superabundant force, fortunately leaving some of them open as safety-valves for the greater security of we poor puny sublunary mortals. In the second skin, or rind, just overlying king Granite and his cousin Gneiss, and cropping up more or less all through the metalliferous little principality, we found *our* egg in its secret Silurian nest. So hard-boiled was it that the mammoth Nasmyth that pounded the "Woolwich infant" into its embryo form could not compress it the billionth part of an inch, nor could the heat of ten thousand boilers alter its density or add to or reduce its bulk, neither could the pellucid streams of the Manchester basin, nor the translucent and salubrious air that it is our happiness to daily breathe, oxydise it beyond the very merest discoloration.

In our quest for our sacred ova we thought it would add zest to the main purpose of our jaunt if we sedulously sought the sweetest spots to *dwell* upon. Having the best Friday in all the year—a Saturday of but little business worth—the most sacred Sabbath of all the fifty-two—and that great boon to quill-drivers and donkey-drivers, Bank Monday—we were enabled to include in our route some of the choicest gems of beautiful Gwalia. At four of the Thursday afternoon clock the magic numeral, 7, was duly represented by that perfect number "coming up smiling, and toeing the scratch with the confidence of going in to win" beaming all over their happy faces. A special compartment was soon "engaged" by the wary and energetic captain, and soon furnished by the sudden eruption of numberless cosy rugs outvying even Joseph's coat in the splendour and variety of their hues. Flasks from innermost recesses, pipes of wondrous form—from the sweet-tasted briar to the elaborately chased and more elaborately browned meerschaum—were soon sending their blended perfumes into the *now* well-accustomed air. By common impulse the eyes of all were withdrawn from those palpable evidences of toil and trouble—the rapidly passing mills, and their inelegant obelisks still feebly vomiting *their* last smoke before a week's holiday. A glance deserved and given to snugly-berthed Frodsham, and gentle thoughts of those shot and mangled when Cupid held high revel there—

"In the days they went a gipsying, a long time ago."

Across the Mersey (with, hereabout, its saponaceous factory), looking sullen and slimy, and tempting not to the thought even of a swim. Soon, ruddy old Cestria came in view, and the minds of nearly all reverted with pleasure to its shady "rows," its quaintly-carved magpie-houses, its castellated walls, its "water-tower," its Grosvenor arch, and world-renowned Roodee. The pretty vale of Gresford next, with its capital trout stream, the Avon; Wrexham and its exquisitely proportioned old church tower; Rhiwabon Junction, to the queen of vales—Llangollen. Who has not mentally endorsed our distinguished friend Edward Morgan's estimate of "the vale of St. Dafydd's, the flower of North Wales." It would be madness in me attempting to describe her wondrous combination of beauties. Let the mouldy Dryasdusts explore Castell Dinas Bran and Vale Crucis Abbey—the small Lyells and smaller Murchisons DO its sheltering hills; the disciples of the gentle Isaak tempt trout or salmon with their (very frequently anything-but-deadly) artificials. Having by any of these means got up an appetite, let them make savage onslaught on Hand or Royal larders. We found most luxurious and hospitable quarters at the latter, with the added blessing of dealing only with land*ladies*—flowers of the "public" parterres. Corwen—haunt of Llewellyn and Glyndwr (Shakspeare's Glendower); Rug (pronounce Reeg, if you please)—western home of one of the very best ponies that ever wore, or did not wear, a shoe, Apricot, who had only one hair in his tail that was not Arabian. Peace to his mane! his good deeds and his good *stock* live after him.

On, then, to the Glan Clwyd Lead Mine, and there we found our Egg, and, by-the-bye, many a crate might be readily filled at the same nest, for the whole bank is strewn with metal—metal in every stage. Ah! Mr. Editor, it makes one philosophise a bit when the Cavendish and Latakia are being wafted by gentle zephyrs, and mixing their faint blue curls with the surrounding æther; how many Easters have floated noisily by, and how many millions floated noise*lessly* by, since our Easter Egg was boiled. When the earth was without form and void—it was there! When Adam donned his fig-leaf breeks—it was there! When the first Pharoah had just set up a beard—it was there! When Caractacus was addressing his simple *expostulation* to the then dominant Roman—it was there! And now, in this far on year of grace, 1875, it is at last disem bowelled to cast a bullet to—shoot a Briton, or a buffalo! Aye, and by-the-bye, the Roman, although anything but dominant, requires "expostulations" still; and, thank Heaven, if we have no Caractacus left, we have a Gladstone, or a Gladimemnon, as the witty (and more than witty) authors of the "Siliad" dub him. Well, we have found our Easter Egg, and now we will carry it home in triumph, and, as so high a service richly deserves, we will make a *progress* with it through— "Gwalia's snowy mountains,
Along her rocky shores,"

Back to Corwen and on to Bala, through whose five-mile lake runs the sacred Dee. Bala is illustrious, too, for producing a cloth containing *three threads to the armful!* Never mind, fashion is capricious; the days of sleeky, slimy black are numbered, and Galway frieze and "Bala broad cloth" will soon be all the rage. On thence to Llanwchllyn, at the top of whose moor you will find the watershed of this part of Wales. One spot of rain may find its way to the Point of Ayr, while its fellow will go to swell the Mawddach and the ocean in Cardigan Bay.

Arrived at Dolgelly we saw the *Chair*, but did not find time (or inclination either, if I must be honest all through my tale) to ascend its massive rugged steps; still, there the hoary giant stood (or sat) stern, grand, impressive. At its feet we knew, for we had seen them years agone, lay the little lakes, to troutmen dear, where the giant and Mrs. Idris shed their briny tears. And now, who has, who can, who ever will fitly describe our next ten miles? We drove, of conrse; who but tasteless clods, or *art*-less *miserables*, would dash through this "thing of beauty" in a railway train? Negatives only can be safely indulged in, with the remembrance of other *gems* by way of comparison or competition, to give those who have never seen it the feeblest notion of its beauty. Here, surely, those lovely lines were inspired:—

"Each gives to each a double charm,
Like pearls upon an Ethiop's arm."

On the one side huge Cader, grey and bare almost to its base, without a peak or crag, or tree or bush, to break the almost solemn grandeur of his unbroken face; on the other, from the river's richly indented edge, the hills are clad in sylvan luxuriance, equalling the Trossachs, and reaching to the very summits of peak and crag, and blending at each quickly succeeding turn into groups of endless variety and beauty—the river now a stream and now a lake, the shore now an island, now a promontory, all ever changing, ever new. But let the refined author of "Ion" speak. Once sailing down the Rhine (Switzerland and the Tyrol having previously been done), he said to his servant (who, I am proud to think, was a Welshman), "John, have you anything in Wales like this?" "Yes, Sir, begging your pardon, between Dolgelley and Barmouth is—BETTER." "Aye, and," said Talfourd, "*I think so too.*" Go, Mr. Editor, and see it. Carrying in your mind's eye (the major portion of our *tower*ists carry them in their "portmantles," having no *mind's* eye) the Trossachs and Dunkeld, the best *bits* of the Lune, the Dooe, the Dort, any ten miles of the Danube, Rhine, or Moselle, and I'll bet you a leek that no continuous ten miles of either of those far-fetched, dear-bought streams will excel, even if they equal, my Cymric pet. Pray forgive me lingering here. It is 15 years since I saw it last, and I have a dread misgiving that I shall never see it again. Well, I am thankful for past mercies, and sincerely thank the Great Artificer for creating such bounteous beauty, and giving me eyes to see and a heart to love it!

Barmouth then; a single street of houses, with one foot on rock and one on shifting sand, with its comfortable and commodious Crosygeddol Arms, where courtesy and cosiness happily combine. Then past-Llanbedr, with its strange, weird, uncanny lake, scooped out of the hills like a huge cauldron, and so deep down therein that only when in the zenith does Old Sol ever cast a loving beam on the poor unfortunate trout that fate has confined in this sombre Acheron. All seem— "Lost to life, and use, and name, and fame."

Then Harlech with its frowning old castle dividing the charge with its opposite neighbour Criccieth in keeping endless, bootless watch on the Snowdonian passes, down which shaggy Celts or Basques (?) will never again descend in angry array to stem the tide of Saxon invasion. *O tempores! O mores!* They run now with open arms to receive the Southron's *arian*; but neither the "Men of Harlech," nor the maids either, availed to arrest our impetuous desire to reach ere nightfall the voluptuous shelter of Maentwrog's "Grapes." All day long had our wondering, wandering eyes been garnering thoughts of pictures yet to be. Now

"Bacchus, who first from out the purple grape
Crushed the sweet poison of glorious wine"

had "made summer in our veins;" we who had tarried there before—and some would e'en tarry there for ever—literally longed to feast our other eyes on Maentwrog's best and bonniest. The long-sought treasures stood at last within our fascinated gaze—blooming, bounteous, courteous, hospitable as ever. The evening sped merrily under that treasured tree.

"Free tales were told. They took the word and played upon it
And made it of two colours."

At length "the wee sma' hours ayont the twal" suggested roost. Tender night-nights, airy dormitories, snowy linen, and cabless streets soon carried all to dreamland again to live in fantasy with those many charms so lately left below. Away again (after longing, lingering, maddening adieus) to Pont Aberglaslyn, with its neighbouring amphitheatre, a fit field for Armageddon with the surrounding hills to seat a gazing world. Then Beddgelert and the magic horn, the faithful hound, and legendary wolf. Quellan Lake with Snowdon high above and covered to the waist with his accustomed garment. Then the sea, with the rivals overhanging Clynnog, with its old old church, and its old old fox of a clerk. Caernarvon next, and its grand old castle still glorious in its partial ruin, but well cared for now, and by a paternal Government's fourpenny fee paying for its own cement. I need trouble you with but little more, for who knows not the Straits of Menai spanned by Telford's aerial and Stephenson's anything-but-aerial bridges. Then long, dingy, money-grubbing Bangor, with the Penrhyn Arms alone redeeming it from the charge of sacrificing everything to brass.

A lovely drive, behind two spanking Flying Dutchman browns, past Lord Penrhyn's stately (I had almost written *slately*) towers, through Lady Louisa's model village (all hearts bless her!), to Aber. Here both men and beasts must need bait, and here, as usual and as ever, the *Slender* of our party sedulously sought his greens. We pulled up at a little *pub.*, kept by a lineal descendant of Tywysog Llewellyn, and after due discharge of all claims of blawd cerch and cwrada, Slender asked the weather-worn raeg of said Tywysog for his darling WATERCRESS. All observed the slightly abashed face of the ancient Britoness, still she had a hostess's duty to perform, and bravely she performed it. With rather uncertain tread she led poor Slender, not to a brook at the bottom of the garden, as he expected, but to a little, but very necessary, edifice, screened by sheltering green.

Away through Llanfairfechan, Penmaenmawr, where great Gladimemnon hoists his spotless flag, to Conway, with its castle and Elizabeth palace. Then with "express" glances at Llandulas, sad scene of the saddest railway catastrophe of our time, past Rhylsandy and snobby-Holywell, steep and *leady*-Flint, bringing back thoughts of Richard and Henry, then Cestria, and home again. I am afraid you will think this Easter Egg has been a long time on the fire, but remember that I warned you it was "a hard-boiled" one.

Your, inextinguishably, ASBESTOS.

MINING, THEORETICAL AND PRACTICAL.

SIR,—Your Barrow-in-Furness correspondent, in the Supplement to last week's Journal, whose signature has an un-English sound, if not an un-English sense, appears to address himself to the subject in a characteristic manner. If I understood the purport of my own letter in reply to his of March 13, it was in defence of practical mining men against an unfounded and untruthful charge. Your correspondent has not attempted to contradict or even to question my statements which claimed for them the association of theory with all their practical undertakings. I have no intention of retaliating with anything like disrespect, although he has shown himself unworthy of notice as much on the ground of his general deficiency of knowledge of the subject upon which he wrote as in his resorting to personal peurilities. If I were called upon to draw a line between theoretical and practical mining, and "dowsing" was presented to me for classfication, I should unhesitatingly place it in the theoretical category, as I have never seen it resorted to by practical men.

I think I cannot be mistaken in coming to a conclusion regarding the object of his writing, as he evidently supposes that he possesses qualifications which mine agents generally do not possess, by combining theory with practice, and at the same time admits the soundness of an agent's practice whilst denying that he possesses any theoretical knowledge—an anomaly which he does not seem to have perceived. I stated in my letter, to which his last is a poor excuse for a reply, that such a thing as the absence of theory from the practical miner's proceedings was next to impossible, and proceeded to show the relation between theory and practice in their application to mining, but instead of attempting to controvert my views he falls back upon himself and repeats his former assertion, "that theory and practice must go hand in hand," and designates the assumption a "contest," though no one opposes it.

Now, as he professedly writes for the information and benefit of your readers in all and every part of the world, "Llanrwst included,"

may I take the liberty of asking him to favour us with an outline of the "theory of mining." I think in his former letter he said something about "surveying and mapping" and "assaying," as belonging to the theoretical side of mining. Will he kindly inform me if my conjecture on this point is a correct one? as I shall probably controvert some of his positions if he proceeds, and in order that we may start fairly it will be desirable at the outset that he should state what we are to understand by theory as contradistinguished from practice in mining, and how that either can be employed independent or unassociated with the other. As we seem to be flooded with the light of technical knowledge springing so spontaneously up from different parts of the country, it is excusable that I amongst others should be desirous to reap some of the advantages which must of necessity flow from its so generous and disinterested dissemination. Our friend, of course, will have no misgivings regarding the issue of contending with his superior qualifications and attainments against my little "dowsing rod" practice, and, therefore, will scarcely be expected to exhibit anything like temper, or to make personalities a last resort. ROBERT KNAPP.

Llanrwst, March 29.

THE NEW WORKS AT NEW CONSOLS.

SIR,—I have just visited the extensive new works at this mine, and can reply in a few words to the frequent letters and queries that have recently appeared with regard to it, whilst the new plant was being erected. The chloridisation and washing processes were set to work a fortnight ago, and being a well-wisher of miners in general, I warmly recommend those who are working similar lodes to obtain permission to visit New Consols. If the process there should prove successful, as I have no reason to doubt, it will cause a regeneration of Cornish mining, and will create a revolution such as the mining world in this district has, perhaps, never experienced before, and this will be due chiefly to the persevering efforts of practical chemistry applied to mining. I can only give a brief outline of the method of working, and some idea of its cost, but it will be sufficient to induce those who are the proprietors of mines to study it carefully. I believe there are no patent rights, except for certain portions of the apparatus, or process, and they are of no great importance, the whole secret resides in the scientific method of working. The stuff brought up yields from 20 to 35 per cent. of arsenic, 2 to 3 per cent. of copper (sometimes rather more), 4 to 12 ozs. of silver per ton, and 30 to 40 lbs. of tin. There is also a minute trace of gold, but that is not looked for at present, though Claudet has got it by his process. The crushed ore after calcining and yielding its arsenic is chlorodised by a method similar to that used in Freiberg, and the copper and silver are thus entirely extracted, the residue being washed for tin, without the use of heavy stamps.

Formerly this mine was worked for tin and arsenic alone, but now the copper and silver also form a very important element of success. In the preliminary trials the copper precipitate yielded 40 to 65 per cent. of metallic copper, and 100 to 370 ozs. of silver per ton. The cost of working 1600 tons per month is about 3600*l.*, and the profits, based upon the lowest possible estimates, should be 2000*l.* per month. Thus, let us take the copper, not at 3 or 4 per cent., but at 1½ only, and the silver at only 4 ozs.; also, let us take arsenic at the very moderate figure of 11s.; at this rate, 1 ton of ore will yield as a *minimum*:—

Copper, 1½, at 16s.	£1	4	0	
Silver, 4 ozs.	1	0	0	
Tin, 30 lbs.	0	15	0	
Arsenic	0	11	0	= £3 10 0

The treatment of 1600 tons a month has been ascertained to cost 3600*l.*, therefore the month's operation may be set down thus:—

1600 tons at 3*l.* 10s.	£5600
Cost of working	3600
Profit per month	£2000

Some allowance must be made for waste, &c., but not at the ridiculously low figures at which I have taken the yield.

These are only rough notes, taken on the spot, by a person uninterested in the undertaking, and they do not, perhaps, show all the capabilities of the mine or the process, nor any of its drawbacks, if such exist. They are, however, sufficient to call the attention of practical miners to the beneficial results which await them in Cornwall if they can see their way to erect plant like that at New Consols, and go to work on some of those lodes which are now being submitted to the old process of stamping, washing, and calcining, with little or no profit. Of course, the great preliminary outlay which has just been overcome at New Consols is a serious consideration; but if such highly satisfactory results can be obtained, surely no amount of previous outlay should deter us from working in the same manner. I regret that I could not remain a month or two in the district to follow the subsequent working of this novel enterprise, and I hope the proprietors of New Consols will excuse my making this use of my visit and publishing these few notes for the benefit of miners in general.—*London, March* 25. W. H. LUCAS, M.E.

PRESENT ASPECT OF CORNISH MINING.

SIR,—Much has already been hazarded as to the probable future of mining in Cornwall, many speculations have been advanced, and whilst some predict a more glorious future others are forced to despairingly deprecate the idea of anything but ultimate ruin. The true guide to the future is the present aspect viewed and reviewed in a thoroughly unbiassed and impartial manner. The position of mining at present is such that those desponding persons who prophesy a still more disastrous state of things might be pardoned for a little despairing, but brave hearts and wise heads never yield to this feeling, but, meeting the difficulty half way, stem the downward torrent, and when the reaction comes profit by it, and they only. If people would only look at mining in a common-sense way, and see things as they really are, we should not now have to deplore the present panic and stagnation. All over the country there is a lull in the different trades—iron, tin, copper, cotton—everything, except a few wagon companies, are dull, and why? Because everyone expects a still further drop in everything. Coal is drooping, and when coal reaches its lowest price a demand will spring up, and once more we shall have a great run up to fictitious prices, only to fall into another panic. These things are almost as regular as the tides—we get a great furore and a great panic every ten years. Panic in 1835, in 1846, in 1855, in 1866, and in 1875. This will probably be over in 12 months, and then prepare for a rush. Oh, for some Admiral Fitzroy on the Stock Exchange to give us the notice of a coming storm. Oh, for some commercial Dr. Cumming to tell us the "Signs of the Times." But, alas, some men seem to be born into this world for the purpose of being gulled or imposed upon. "Surely them as has money and no brains was made for them as has brains and no money." Many of that numerous class—outsiders—appear in this light, and by their seeming indifference and their evident carelessness hold out a premium for unprincipled men. They invest capital in mines without an enquiry as to the prospects, the character of the management, and the percentage of tin in the rock. Contented to rely solely on the representations—or, rather, misrepresentations—of their informers, they go in wildly, madly, thoughtlessly, like schoolboys at a game, like gamblers at a German "hell:" of course they lose, and, wonderful to relate, are surprised at the *denouement*—nobody else is. Let the intending investor spend 12*l.* in a personal inspection, accompanied by a practical man above suspicion, and judge whether it is worth his notice or not; try it in the balance of actual merit. Some well-known inspecting mine agents have a stock of words of which some at least always find their way into reports—"splendid property," "finest speculation in the whole county," "congenial rock," &c. This is the bait, and the unwary one rushes at it to find that he has been "hooked." Angling is a noble sport; lasses fish for lovers, but these anglers, keen-eyed, and still keener in wit, fish for men, and find them as rash as pike and unsuspecting as perch. Noble sport! watching the client nibbling the bait, getting more and more venturesome, till he boldly bolts the dainty morsel, which turns sour on his stomach, and the bitterness enters his soul.

But let the outsider beware the traps, and investigate his property's worth, and impose trust in the right place, and he is safe. There is room for many better mines in Cornwall, and many places unknown to fame now will, we doubt not, be successfully worked ere long. We find that too many interested in Cornish mining have not yet discovered when to stop. Mines may be capable of returning large quantities of mineral, setts may be extensive, and operations may be carried on never so vigorously and fairly, but should not the very facts that works have been prosecuted for many years, always at a loss, that the mines are deep and the shareholders exhausted; and, if these are confuted, the very *poverty* of the mines beneath alone should decide—should tell their owners that even hoping against hope would never make the mine successful, and that now their duty lay only in surrendering at discretion. Promises avail not, for behind them we see a background of litigation, dispute, dissatisfaction, Stannary Court, and ruin; and is not this the condition of many mines now? Lop off the barren branches, well prune the tree, clear the atmosphere, and a new and bright future must and does lie before us. With the working classes this means present suffering; but all squeamishness is out of place now, and dire necessity compels it, the interests of the county call loudly for it. Many mines which are selling now at less than half their value would, on an improvement in the general tone of business, rapidly rise and well repay the investor. In nothing is there such scope as in Cornish mines, and many need only to invest capital, and, after waiting a short year or so, to double their capital; but the investment must be made in a *bona fide* property, for others are naturally precarious, and generally, if not always, dangerous. EXPERIENTIA DOCET.

April 1.

TECHNICAL EDUCATION IN RELATION TO MINING.

SIR,—Your correspondents "Arquerite" and "A Cornish Quadruped," the latter, no doubt, signing his proper name because the lion's skin was not within reach, seem to be much piqued at my letter of March 10, and have given vent to their unenviable feelings by letting forth a flood of language which could scarcely have been expected even from an anonymous writer. As to "Arquerite," who may well be ashamed of appending his name, I need give no other answer to his unwarrantable insinuations than is afforded by the statement that I am not the John Roberts described by him, though it was nothing to the discredit of the John Roberts mentioned to have earned a prize in the Breage Mining Class, no member of which, I trust, for the honour of Cornwall, would have been so wanting in self-respect as to have penned such a letter as that which "Arquerite" has written. With regard to your second correspondent, I can merely say I never enter into discussion with a quadruped, but with reasoning beings.—*Carnarvon, March* 29. JOHN ROBERTS.

EXTRACTING GOLD FROM AURIFEROUS PYRITES.

SIR,—I am pleased to observe that a copy of the report of the Pyrites Board, lately issued to both Houses of the Victorian Parliament, has been forwarded by the Chairman, Mr. R. M. Sergeant, to the *Mining Journal*. Taking great interest in the treatment of gold ores, and in the concentration and treatment of auriferous pyrites on the very system which the Pyrites Board of Victoria have recommended, I am desirous of directing attention to the subject, the importance of which must be my excuse for addressing you. I may remark that the members of the board have been for years interested in gold mining, and to some of the members, with whom I am personally acquainted, the mining companies of Victoria are indebted for many of the improvements which are now being used in the treatment of gold ores, and they are, therefore, well able to form an opinion of the value of any process having for its object the profitable treatment of auriferous pyrites. I feel satisfied that the question has received the most careful investigation, and that not without good reasons have the board arrived at a decision confirming the value of an operation which has been successfully carried on in the colony. It is possible that after such an opinion attention may be directed to the proper treatment of auriferous pyrites. I shall be glad to learn that such is the case, for, although I have hitherto unsuccessfully endeavoured to impress upon some with whom I have been connected in gold mining the value of the concentrated pyrites, I believe that the mode of concentration and treatment only requires to be better known and adapted to become one of the most profitable operations for the extraction of gold, when combined with the usual process for reducing the ores.

Auriferous quartz (I speak after an experience of many years) generally carries from 1 to 5 per cent. of auriferous pyrites, the concentration and saving of which should be one of the most important considerations at any establishment having for its object the extraction of gold from auriferous quartz. Unfortunately, it is too often the case that most valuable products are, without any consideration whatever, allowed to pass away as waste! The necessity for a more careful supervision of the waste products by concentration will be apparent when I state that every ton of auriferous pyrites may be worth from 3 to 5 ozs. of gold, varying with the degree of care and attention which have been paid to the process of concentration. I may mention, of my own knowledge, that a certain company has for years carried on a system of concentration and treatment of pyrites from material containing from 1 to 1¼ per cent.; whilst another company has for years allowed material to pass away which would have returned, by concentration, at least 5 per cent. of auriferous pyrites.

Attention being now again directed to Gold Mining in Wales, it is to be hoped that better results may attend the operations than in former years, when many investors were unfortunately deluded, and too late discovered that something more than machinery was requisite to obtain gold. Knowing something of this locality, I am of opinion that there are auriferous veins which will, with a moderate capital judiciously expended thereon, return steady and legitimate profits on a yield of a few dwts. per ton.

The general opinion is that a gold mine must be rich, otherwise it is not possible that it can be made to pay. It is this prevailing idea which deters people from investing in any enterprise where the material to be treated is estimated by dwts., nothing but ounces will tempt them. They altogether lose sight of the fact that in some localities dwts. can be made to pay, whereas in others an ounce may barely cover the cost of working. A mine returning dwts. is more likely to continue permanently productive, and, provided the material is in quantity, offers much better security for the investment of capital.

I am not aware that any poor gold ores have been profitably treated in this country, and, therefore, anything which is brought to light relative thereto, such as the report above alluded to, is worthy of every consideration and attention. C. J. HARVEY.

Moorgate-street, E.C., April 2.

EXTRACTING GOLD FROM PYRITES.

SIR,—I have been reading very earnestly to-day the statement of those gentlemen appointed to make a report upon the best modes of extracting gold from pyrites. Now, as far as the report goes, by advising that the stones should be crushed raw, as they term it, they are perfectly right, for to roast large pieces of stone is simply to waste fuel and money. But they are altogether wrong in proposing large furnaces for calcining the fine pyrites, for as sure as it touches the naked fire the fine gold goes off as well. Now, every furnace-man knows that there must be a good draught to his furnace, and that great care must be taken with it or the best part of the stuff goes up the chimney, and that is the difficulty with fine pyrites. But if you adopt the plan of drincing the sulphur by heat instead of a naked fire, then you will have no difficulty in not only getting rid of the sulphur, but in getting the gold. When Mr. Yudey was in London, who is now at the Eclipse Mine, he told me that their richest stone was a strong pyrites, and their greatest difficulty was in endeavouring to get rid of the sulphur, as they lost so much gold in the tailings, and told him there was only one way of getting over the difficulty, and it was this: the stone must be crushed very fine, and then drive the sulphur off by heat, but in no way to touch it with flame, or in any way with a naked fire; then pass it over the quicksilver as thin as a sheet of paper, and depend upon it you will get your gold. There is no doubt about the Eclipse being a rich mine, but it will always be poor till the ore be properly treated. What applies to this mine applies to hundreds of others that would be rich if the parties about to work them would look at this simple mode of doing the work. It does not want a philosopher to tell a long story over it; but just go to work in this simple way, not trying to get through a great quantity of stuff and get no gold, but rather do less, and get all the gold, which would be much easier.

12, *James-street, April* 1. ——— J. WALKER.

TREATMENT OF POOR COPPER ORES.

SIR,—The Journal of last week contains a long account of a new mode of treating these ores, patented by Mr. J. P. Wilkes, and read before the Snowden Mining Company. It has been my lot to read many new (?) and patented inventions for this purpose, propounded by all sorts of people, but rarely one so utterly "innocent" as this. Let us see, now, what this patent process consists of, and which Mr. J. P. Wilkes so kindly tells us is in plain English the conversion of the copper into a sulphate and washing it out, then precipitating the copper by sulphuretted hydrogen. Now, if this class of inventors would simply take the trouble to read any of the numerous books on Metallurgy they would find that all they have found out has not only been well known, but practised before they were born. However, the object of this letter is not to teach them their business, but to prevent the public being deluded by such schemes. I shall, therefore, merely glance at the plan said to be devised by an eminent foreign metallurgist for a mine in the Alps, and now patented for this country by Mr. J. P. Wilkes. He begins by crushing the ore, mixing it with lime, &c., and roasting it. Will he kindly inform me what is the action of the lime, and if, after being at the expense of crushing his ore small, he finds it roast better made up again into lumps or bricks? After having answered these questions I would advise him to go to some alkali works and ascertain how they treat their green smalls, and how much of the copper remains in the state of sulphide, of sulphate, and of oxide. From this he may learn how much copper he will leave in his residues. Assuming, however, that all such details as these have escaped his notice, perhaps he will inform us what the action of the lime will be in the washing tanks, and give us the result of his experience. The next part is the precipitation by means of sul. hyd., and the production of copper sulphide of 50 per cent. Perhaps Mr. J. P. Wilkes will inform us if he ever saw 1 cwt. of such a product; and, putting aside all such trifles as clearing out, drying, and making ready for market, if he ever sold a single ton of it, and if so what was the produce by dry assay? Probably he will be surprised to hear it will be nearer 12 than 50 per cent., even if saleable at all. Finally, after saturating his copper solution with sulphuretted hydrogen, so that it is no longer capable of holding any more copper, he proposes to use it to dissolve out the fresh charge.

Having now gone through Mr. J. P. Wilkes's patent, I will make a few remarks on the impropriety of some people in coming before the public with their "ideas" before submitting them to some experienced men; and in the first place refer to his own remarks, that almost all the Spanish cupreous pyrites is chlorodised, or, in plain English, roasted with salt, and the copper precipitated by means of scrap iron from the chloride solutions. I believe that upwards of 200,000 tons of these ores are treated annually by this means; and when we find such chemists, metallurgists, and sound practical men as Claudet, J. A. Phillips, and J. Down, to say nothing of the other numerous clever men engaged using this process (when that of Mr. J. P. Wilkes is perfectly open to them), I think that anybody with ordinary sense would pause and ask himself if he had not made some mistake. I would strongly advise the Great Snowden Mining Company to do the same, and if they really want advice how to treat their ore to go to some practical miner. There are plenty of extraction works where the sulphate plan, as well as other schemes that have lately appeared before the public, have been fully tried out and abandoned for better ones before those who want to introduce them were ever heard of. TOUGH INGOT.

SUCCESSFUL AND UNSUCCESSFUL MINING.

SIR,—* * * * Now, Sir, I have been accused of writing unintelligible letters without an object, but allow me to reiterate (although I have not, like some of your correspondents, enumerated a long list of failures) my former statement, that "unqualified agents" are, firstly, secondly, and thirdly, the principal cause of unsuccessful mining. I would also say the following disqualifications constitute an unqualified agent:—1. Lack of energy.—2. Having made no observations relative to mining, believing "Where it is there it is."—3. Having received no technical education (nor even smattering) of the sciences allied to mining.—4. Not knowing anything about the selection and erection of machinery, or the fixing of mine requisites.—5. Ignorant of the mode of treating or dressing the ores raised from the mine. The five above named sources of failure I will endeavour to enlarge upon through the columns of the Journal. I do not deem it essentially necessary that an underground agent should be thoroughly skilled in the art of preparing ores for the market, or, *vice versa*, surface agent with the ramifications of underground life, but do contend that the manager of a mine should be more than superficially acquainted with mining in all its branches, unless two or more such functionaries have these qualities combined, each working the department in which he is proficient. Who ever advocated such a scheme "as miners being manufactured by mere book learning?" I have not from the commencement; but depend upon it the time will come when the "one-legged" man shall be superseded by the much-abused "theory and practice" man. Mr. Knapp, will you kindly inform me who penned the following sentences a few months back:—"But if one should ask upon what their (the agents) thoughts are exercised, and the much-vaunted opinion founded, there is a unanimous silence until the reverberations of space echo, 'upon?'" Again, if mine captains—I suppose the writer meant unqualified—being a scurrilous excrescence upon the fraternity, as well as a blot upon the social escutcheon of any civilised community—query, were all Cornish miners excluded?

Beacon Camborne, March 31. ——— THOS. HENRY ALLEN.

GERMAN VERSUS CORNISH AGENTS.

SIR,—In last week's Journal I observe another showy epistle from your misguided correspondent Mr. T. H. Allen, who has got himself stuck in a literary quagmire—every exertion made with a view to his release only sinking him deeper and yet still deeper, to his own confusion and dismay. The efforts he makes to clear himself are ludicrous in the extreme, and only furnish proof more clear, if such were required, of what I stated in a letter a week or two ago. He says, "I have an idea of their ability to work when directed by men of ability and brains, certainly." Now, it is satisfactory to know that Mr. Allen has an idea, because from his previous letters I had conceived a notion that his ideas were of very little weight or importance, but I am reassured. Nowithstanding said idea, Cornish agents are employed in situations of immense responsibility and trust all over the world; and as Mr. Allen says they are unqualified, all the world is at fault—or Mr. Allen. Which is it? Evidently Cornish mine agents are not generally unqualified. If Germans and Americans were superior to the English we should have crowds coming and ousting our native captains, but I know of only two German agents in Cornwall—both in phantom mines, which produce absolutely nothing—whilst Cornish agents are in Germany, in Russia, in Italy, Spain, Belgium, Portugal, and France, carrying on mining operations successfully. This alone shows that Cornwall—a little semi-insulated, out of the way place—is as far ahead as any country in the world; that with its population of (say) 400,000 souls it can, as far as the knowledge of its mine agents is concerned, compete with intellectual Germans or go-a-head Americans. What reason has Mr. Allen for his rancour and hostility to his fellow countymen? Is it jealousy—the green-eyed monster—or is it spite?

——— CORNISHMAN.

DON PEDRO MINING COMPANY.

SIR,—The shares of this mine ought not to stand under par. By the latest advices the amount of 1650*l.* was cleared for the month of February. This is just 20,000*l.* per annum. Don Pedro is about the only property which, with Javall, will be able to run a neck and neck race with the great St. John del Rey Mine. The venture has twice returned at the rate of 50,000*l.* per annum clear profits; and as to its future, it may be said in three words—"She will round," as undoubtedly the mine will do. These shares have commanded 4*l.* to 5*l.* prem. Three years

since the property paid a 2s. dividend quarterly, and now appears to be the time for the mine to return to prosperity. Perhaps some of your correspondents may be able to offer some explanations or information. The meeting is soon coming off, and the returns are looked for with much interest. OBSERVER.

London, March 31.

[For remainder of Original Correspondence, see to-day's Journal.]

Meetings of Public Companies.

BOLIVAR RAILWAY COMPANY.

The annual general meeting of shareholders was held on Wednesday, at the offices of the company, New Broad-street,

Mr. J. C. BOWRING in the chair.

The SECRETARY read the notice convening the meeting. We give the following extracts from the directors' report:—

The delay caused by an unusually long wet and unhealthy season, and more recently by a revolution breaking out in Venzuela, the latter involving great interruption to the works by reason of the dispersion of the labourers, renders it unlikely that the hope expressed at the last meeting—of the railway being completed by June next, so as to allow of the continuous transport of ore to the coast—will be realised. This revolution is now, happily, crushed, and, as is shown elsewhere, the works are being prosecuted with all vigour, and are making rapid progress under the combined influences of fine weather and an increasing supply of labour. Strong representations having been made to the board by persons who have visited the country, and are acquainted with the locality, that it would be highly undesirable to make Punta Brava the terminus, and this view being fully concurred in by the engineers of the company and the agent of this and the New Quebrada Company, an arrangement has been entered into with the directors of the latter to adopt, tentatively, Tucacas as the terminus, on terms which, it is believed, will be mutually advantageous. The directors have, acting in concert with the New Quebrada Company, availed themselves of the services of Mr. C. Campbell Downes, C.E., who proceeded to Venezuela on Jan. 17 last, for the purpose of consulting with the resident engineer as to the details of the terminus and other questions of importance. Mr. Downes's report on the line, as well as on all matters generally affecting the interests of the company, may be looked for shortly, and the proprietors will be duly advised of its contents.

The CHAIRMAN said the directors' report and the agents' letter contained such full and detailed information that very little remained for him to say. The works had, unfortunately, been subjected to considerable delay, owing to causes over which the directors had no possible control; they had experienced the wettest, the most unhealthy, and the longest rainy season which had occurred for 30 years, in addition to which the revolution almost entirely stopped the works by causing the dispersion of the men. By later accounts the climate had become everything that could be wished, and the men were coming back in numbers, and the contractors had more applications from labourers than they could provide work for. The latest advices, dated March 1, confirmed this statement. The works were reported to be completed as far as San Antonio, and the clearing of the line had progressed to Belvidero, and the part between La Luz and the point nearest the mines had been cleared, and it was believed that by June the rails would be laid to Palma Sola. As he had said, everything was now going on satisfactorily. The directors expected that by the end of the year the line would be completed to La Luz, within two or three miles of the mine; and the attention of the directors of this company, and also of the Quebrada Company, would be devoted to bringing down the ore as soon as it could be shown that benefit and profit could be derived from the shipment of ore to England. The board had been informed that by the latest advices the directors of the New Quebrada Company fully expected to carry out their portion of the contract with respect to the delivery of the ore mentioned in the contract—20,000 tons per annum. By the end of the year there would be a considerable quantity of ore to come forward. With respect to the change of terminus from Punta Brava to Tucacas, from the first moment Mr. Shepherd went out there he had his attention drawn to that question, and, after due consideration, it had been agreed that Tucacas should be tried, but if it were found that at the end of two years the ore and produce could not be satisfactorily shipped there then the terminus would be removed to Punta Brava, and the directors had reserved to themselves to do that within the time the New Quebrada Company had power to take over the line. It had been arranged that should the line be completed before the time agreed upon with the Quebrada Company, a proportionate reduction should be made from the amount of ore they were required to deliver within the first 12 months; and secondly, if in consequence of the change of terminus there would be a saving to this company, and a proportionate reduction would be made upon the carrying rate which the Quebrada Company was to pay for bringing the ore to coast on such a saving being actually determined. The Quebrada Company had met this company fairly and honourably; this company was compelled to take a considerable portion of ground at Tucacas belonging to the Quebrada Company, and the Quebrada Company had conceded that portion of ground, and it was believed that by this change of terminus, after allowing for necessary enlargement of works, and cost of buildings and alterations, there would be a saving of between 9000*l.* and 10,000*l.* to the railway company. The attention of the directors had been given to the important subject of bringing fresh water to Tucacas, and they had sent out pipes and tanks sufficient to supply 40,000 gallons daily, in addition they had taken steps to reclaim and cultivate ground for the purpose of growing fresh vegetables and provisions, which had at present to be imported.

A SHAREHOLDER asked the distance of the fresh water springs from Tucacas?

The CHAIRMAN: About three miles. There is an incline, and the water flows readily. There is no doubt about the quality of the water.

In answer to a shareholder, Mr. LEAROYD (the Chairman of the New Quebrada Company) said that the alteration of the route would be a mutual advantage to the New Quebrada Company and the Railway Company, the latter of which would be spared the erection of some expensive works which they would have had to execute if the terminus had been taken on to Punta Brava. The Railway Company would have to provide lighters to put the ore on board ship. But, as stated in the report, the making of the terminus at Tucacas was simply an experiment, if at the end of two years it was not found to answer then the Railway Company would be required to carry on the line to Punta Brava.

The CHAIRMAN, in answer to a question, said that the President of the Republic looked favourably upon the project, and, in fact, was anxious that the line should be taken from Palma Sola to San Filipe. The full rights of the company had been properly recognised by the President. Every effort was being made to finish the line to the mine by next spring. He moved the adoption of the report and accounts.

Mr. JAMES ANDERSON seconded the resolution, which was put to the meeting and carried. The retiring directors, Mr. J. Anderson and Mr. F. H. Hemming, were re-elected. The auditors, Messrs. Quilter, Ball, and Co., and Mr. Wm. T. S. Oakes, were also re appointed.

A vote of thanks to the Chairman and directors closed the proceedings.

JAVALI COMPANY.

The seventh ordinary general meeting of shareholders was held at the Cannon-street Hotel, on Wednesday,

Mr. CHARLES GREEN in the chair.

Mr. EDW. SCHUBERT (secretary) read the notice convening the meeting; the report and statement of accounts were taken as read.

The CHAIRMAN said that at the previous meeting Mr. Sewell expressed regret that he should have been called upon to take the chair on that occasion in consequence of the death of their late chairman, Mr. Hall. Any regret which Mr. Sewell had then expressed could not exceed that which he now felt in appearing as a substitute for Mr. Sewell, who was prevented by illness from occupying the chair. He was not sure that he could give them much further information than was contained in the report. The results, although not grand, were better than any they had been able to present before, and he trusted it was an earnest for the future. Mr. Hatch, who had taken the place of Capt. Sohns during his absence, was recommended by the late Mr. Hall, their chairman, and he had shown very great intelligence in the way he had performed the duties. During much of the time he was there he had been without the assistance of a medical officer, and had himself acted in that capacity, and once performed a very clever surgical operation. The most important item in the report was that they had been able to effect a very satisfactory arrangement with the trustees of Mr. Hall, to whom, at the time of his death, 7000*l.* or 8000*l.* was owing, and bearing 10 per cent. interest. They had very liberally taken 7 per cent. debentures, redeemable in five years, instead of continuing the 10 per cent. interest, and he hoped that the unusual faith which Mr. Hall had always had in the enterprise would eventually not result in loss to those whom he had left behind. As to the directors, the board had been reduced to a very low number—Mr. Sewell, Mr. Hall, and himself—but he was happy to announce that he thought they might consider that they had secured the services of Sir Leopold Heath, who, he hoped, had consented to join them. As to the accounts, the most important item was the transference of Mr. Hall's debt to the debenture account, to which he had already referred. As to the future, he might congratulate them that although an improvement was observable in the report presented to them, the receipts for the first months of the present year showed a further improvement, as compared with the corresponding period referred to in the statement they made to them. Their receipts in the first three months of 1874 were—in January, 69*l.* 2s. 9d.; in February, 59*l.* 0s. 5d.; and in March, 250*l.* 16s. 10½d. In the first three months of the present year their receipts had been—in January, 54*l.* 5s. 11½d.; in February, 512*l.*; and in March, 1507*l.*, so that their improved position was apparent. He then read the last letter received from Capt. Sohns, in which he remarked that such a result had never before been obtained, that it would be interesting to glance through the mill returns to see how satisfactory was the progress being made, and that they might expect another such result next month. He hoped that from moderate good they would go to greater good, and that the shareholders would be well repaid for their perseverance. He need not, he thought, say any more on the matter, but would be glad to furnish any further information which the shareholders might desire. He concluded by formally moving the adoption of the report and balance-sheet.——Mr. HALL seconded the motion.

Sir LEOPOLD HEATH said that he mentioned at the last meeting that there was one of their Articles of Association which he considered very objectionable; 1000*l.* a-year was secured to the directors for the time being, and this was to accumulate. The directors were not to receive it until the shareholders had received dividends equal to an average of 5 per cent. per annum, but the directors were then entitled to receive all the back payments, and it was further provided that when 20 per cent. was divided in any one year the directors were to have 2000*l.* He had stipulated, as a condition for his accepting a seat at the board, for the wiping out of that article, and the substitution of an article securing 300*l.* a year to the directors at once, for he considered unpaid services were seldom worth much, that the directors' fees should be increased to 500*l.* per annum when the company was in a dividend-paying state, and that when the shareholders received 10 per cent. dividend the directors should then receive 5*l.* per annum extra for each additional 1 per cent. of dividend. He considered the payments in arrear should be wiped out, and had suggested that 500*l.* in debentures should be given to the present board in liquidation of their arrears of fees. He thought that when they first got their capital they could readily have obtained larger working capital, so as to have got their machinery at work sooner. They heard what they could do with 20 stamps, and if they could double the number he believed they might double the gross profit, if they did not double the net profit.

A SHAREHOLDER said that Capt. Sohns had told him when in London that with regard to the engine sent out from England he had given the directors the necessary dimensions, and that instead of following them the directors sent out an engine not at all suited for the purpose for which it was required; indeed, a second-hand one, he believed, bought in London.

Mr. H. HUGHES could not, as he had supplied the engine referred to, permit such a statement to pass uncontradicted. It was not a second-hand engine, but was designed specially for the company in accordance with instructions received from Capt. Sohns, and was, moreover, made so that no part should exceed 1 cwt. in weight, so as to facilitate its carriage. He had, moreover, Capt. Sohns' own letter stating that he never saw a better engine.

The CHAIRMAN, in reply to the questions of various shareholders, stated that as to the stamps they were sent out when asked for, and the board depended upon Capt. Sohns' judgment as to the time and manner of putting them up; there was some delay in making them fit with the engine, but he was not aware of unnecessary delay. As to writing off anything on account of machinery, nothing had yet been written off. The price which their gold fetched was from 52s. to 55s. per oz. As to filling up the vacancies at the board the directors considered five to be the proper number, but whether they had five or four, as suggested by Sir Leopold Heath, the shareholders might rest assured that their interests would be cared for. If they had had ten directors during the past year, which was one of great labour and anxiety, their interests could not have been better cared for, and there was no one in whom he would place more faith than Mr. Sewell. As to the vacancies at the board he would be disposed to recommend five directors. As to the new engine ordered at New York it was ordered by and was being constructed under the direction of Capt. Sohns, so that he hoped there would be no hitch. For himself he was not a mechanic, and could, therefore, give no details as to the engine. A shareholder had referred to the regeneration of the company, and with regard to that observation he would merely say that he hoped they would be benefited by Sir L. Heath joining them, but he was not aware that regeneration was necessary. Their great difficulties had now been surmounted. As to the quotation of the shares on the Stock Exchange, the matter had been somewhat neglected perhaps, but recently it had been taken up again; they were now about to furnish the necessary documents to the committee of the Stock Exchange, and they learnt from the secretary that in about a fortnight they might expect the quotation to be given.

The report and balance-sheet were then unanimously adopted.

The CHAIRMAN, in reply to enquiries, stated that the board had no objection whatever to the holding of their meetings half-yearly; and that with regard to the remuneration of the directors for past services, their solicitor told them that every past director, or his representatives, would have a direct claim for his part of the 1000*l.* per annum for the time he served whenever the average 5 per cent. per annum had been divided among the shareholder. As, however, the company had now been in existence seven years the shareholders were entitled to 35 per cent. dividend before the directors' claim would arise.

Sir LEOPOLD HEATH considered that the whole 7000*l.* arrears would be divisable amongst the directors, whoever they might be, when the claim arose.

Upon the proposition of Mr. KIRKBY, it was unanimously resolved "That the shareholders congratulate Capt. Sohns on the improvement in his remittances, and trust that they will continue to improve during the whole year;" and thanks having been voted to the Chairman, the meeting separated.

NEWFOUNDLAND MINING COMPANY.

A Conference of the shareholders was held on Wednesday, at 35, Walbrook, to consider the course to be pursued at the extraordinary general meeting, to be held the same day.

Mr. EAST, a large shareholder, having been voted as Chairman, he called upon—

Mr. MERRIMAN, solicitor, who said that he would like to clear away one ground of personal dissatisfaction or complaint on his part. It was very undesirable that professional men should allow any personal grievance to interfere with the course of business. But the directors had published a circular which contained charges not against his client, Mr. East, but against himself and those associated with him. There was not the slightest foundation for this—in fact, it was the reverse, as every gentleman who was at the last meeting would say. This circular stated the action now being taken was injurious to the interests of the shareholders. Those who were present at the last meeting would agree with him that a case for winding-up in any form had not then been made out. He would not, however, dwell upon this, but to attribute to anybody a desire to create a winding-up, and that a most expensive and dilatory one, when his advocacy had been directed in a totally opposite direction, was a libel, especially when speaking to a man in his profession.

Mr. MARSH considered this a very curious idea of the law for a professional man to hold.

Mr. MERRIMAN continued that this illustrated the tactics of the people with whom they had to deal. On the last occasion he had considerable difficulty in getting access to the meeting, and in getting a hearing, until after the resolution for winding-up had been passed.——Mr. MARSH would take the liberty of correcting Mr. Merriman. There was little objection made to his attendance, and he was treated with every courtesy by the directors.

Mr. MERRIMAN did not complain of any want of courtesy. There was no lack of personal courtesy, but there was a disposition on the part of the Chairman to pass the resolution. Subsequently he had addressed a letter to the Chairman of the company, which within the four corners of it showed clearly his intentions. These were to get an adjustment of the company's affairs. The present meeting had been called with the intention of getting as many of the shareholders as possible to determine what would be the wisest course to pursue. To his regret, he found that the convenience of nearly all of his correspondents would not allow them to attend this meeting, but as they had got a reasonable attendance he would take their sense on the matter, especially as he had proxies from his absent correspondents, which he would avail himself of at the subsequent meeting. These proxies represented over 300 shares, and they had not been obtained by any species of clandestine operations or touting. They had been sent in answer to a circular and a copy of the correspondence. A shareholder, who was not then present, but who would be at the next meeting, and who was acting with them, had led him to understand that they had as much ore at the mines as would fill three vessels, and that the gross pecuniary value of this would be several thousands of pounds. Now, knowing what took place at the last meeting, he should say that either the telegraph had been set in motion, and that a discovery of considerable value to the shareholders had been made; or the contrary inference was that ore was lying there with the knowledge of the directors, who had said there was no means of paying off Colonel Feilden's mortgage. This showed that there was no necessity for winding up. He would put the question to the directors, why had they not laid before the last meeting the last advices from the mine, particularly as to the existence of this ore? Before the resolution for winding-up should be confirmed he wished to know all about the present position of the mine, and about the scheme of so called reconstruction which the directors had got in their pockets, and which the proposed liquidator was to carry out. He would say that his correspondents had written him very extensively, and their letters contained almost every form of anathema, and censure, and complaint. One gentleman said he had lost 10,000*l.* by faith in Sir Alexander Malet's name as a director. Another said that the way in which the mine was worked created a suspicion that the plan was to bring it to grief in order that there should be a reconstruction, by which somebody was to be benefited. He (the speaker) did not endorse any one of these statements. They might be the unfounded expressions of people who were smarting under losses, but he would say that with such a deep feeling of not unnatural dissatisfaction in the absence of all information, the directors ought to lay the whole affair open, and if winding-up must come, and it ought not to be a compulsory winding-up, and if the directors would admit that they had been deceived by the promoters, let them admit the error, and hand over the liquidation to some independent party. The course which his client, Mr. East, would adopt with regard to the proxies would be to press for an adjournment until some satisfactory information could be supplied, and until a case for winding-up the company was laid before the shareholders. If they could not effect this, then his advice would be to have a voluntary liquidation, but under the supervision of the Court; for though it was true, theoretically, that under a voluntary liquidation they could go to the Court, yet everybody who knew about the matter could say how reluctant they were to grant an application. If they must wind-up he would not object to a voluntary winding-up, provided it was not done by the directors. Their conduct must be subject to enquiry, and therefore they must have an independent liquidator. He had gone into the question of a liquidator very carefully, and he was now prepared to propose Mr. W. J. White, of King-street. This gentleman had consented to advance sufficient money to pay off Col. Feilden's mortgage, it being the only present difficulty. He had taken the share list to Mr. White, and in looking over the names he saw one whom he knew well, and who, he believed, would assist in the matter if necessary. He pressed Mr. White to send his clerk to see this shareholder, and the result was substantial advice not to advance the money; the words were, "it would require a large sum of money *plus* the 6000*l.*" He was not now in a position to say whether Mr. White would advance the money or not. The practical policy to pursue was to have an adjournment, to permit of investigation; if they were to have winding up at all it should be voluntary, under the supervision of the Court; or voluntary, with an independent liquidator.

Mr. MARSH could not see the use of an adjournment. A respectable accountant —Mr. Price—was appointed to wind up, but, as he was a directors' nominee, he should prefer another.

The CHAIRMAN then proposed "That in the event of the company being wound up the liquidation should be voluntary, under the supervision of the Court; and that Mr. William Joseph White, of Cannon-street, should be appointed liquidator."

Mr. TUCK seconded the resolution.

Mr. MARSH proposed that Mr. Cape's name should be substituted for that of Mr. White.

Mr. MERRIMAN objected to Mr. Cape, on the ground that he was the liquidator of the estate of Holderness and Nott.

The amendment, not being seconded, fell to the ground, and the original motion was then put to the meeting, and carried.

Mr. RUSSELL said he knew Mr. White well, and believed he would do his duty to rescue the property from being destroyed.

A vote of thanks to the Chairman closed the proceedings.

NEWFOUNDLAND MINING COMPANY.

A special meeting of this company was held, on Wednesday, at the Cannon-street Hotel, to confirm a resolution passed on March 12 for the voluntary winding-up of the company by liquidation.

Sir ALEXANDER MALET, Bart., K.C.B., in the chair.

The CHAIRMAN said: If we can convince you that the course we have taken is forced upon us by a necessity, which we deplore and lament as much as any of you can, I think I may leave all subsidiary points aside. We called upon the shareholders to advance money on debentures to enable us to carry on the business of the mine, and you all know what a complete failure that was; at least, you do not know how small a response that call met with. We have made ourselves personally responsible to a very considerable amount, and one of our members—Colonel Feilden—has advanced upwards of 6000*l.*, and we are all personally responsible to him for portions of that sum. We cannot carry on the mine, although it has arrived at a point that we feel perfectly sure, if we were able to carry it on, it would be a most profitable and excellent concern. It is one of those unfortunate mining adventures which, as often happens, are brought to a certain point of exploration or development with a capital which has done, perhaps, not all the work which it ought to have done through mismanagement, but had brought it to a point that hopes of the future were perfectly well founded, but because our capital has failed we must sanction the liquidation. At the last meeting there was a question raised as to the necessity of liquidation, and I was under the apprehension that there were only two sorts of liquidation, voluntary and compulsory, and under that impression I sent out a small circular. I meant no personal imputation in that circular, though it has been taken as such. We think that voluntary liquidation is the best, and we continue to press it upon your attention. I need say no more, but will move—"That the resolution to wind up the company voluntarily, passed at the general meeting of shareholders, held on March 12, be and the same is hereby confirmed." There has been a good deal said and written as to our being unprepared with any scheme of reconstruction. You may easily imagine that something of the kind has been presented to us, and that we have deliberated maturely upon it; but we have not been able to fix upon any scheme. We shall be ready to hear suggestions on that subject. If there was any prospect of money coming forward the whole scheme of liquidation might be put aside, but we have appealed to you in vain, and we wait for your sanction to the course we propose to take. If the liquidators are appointed you must not suppose that it will be a secret investigation. The liquidators will call you together, and lay any scheme they may have *in embryo* before you ask your sanction to it.

Mr. J. WALKER seconded the resolution.

Mr. JULIUS MARSH put several questions, in reply to which—

The CHAIRMAN said a statement of the company's affairs was placed before the shareholders at the last general meeting. The only additional information that could be given was that, owing to the very severe weather, several mails had been missed, and the further accounts had not come to hand, but by telegrams it was ascertained that the miners had been short of provisions, but that difficulty had been overcome, and the mine was still in a promising condition.

Mr. MARSH asked whether a statement in the newspaper was correct—that the company started with a capital of 24,000*l.*?——Mr. BYERS said the working capital was 15,000*l.*, and Col. Feilden had advanced another 6000*l.*

Mr. MARSH remarked that in the original prospectus the value of the mine was estimated at 60,000*l.* a-year, so that at 10 per cent. it ought to be worth 600,000*l.*

Mr. VAIL said he had estimated the property to be worth whatever it would bring. He was through the mine some years ago, and had every reason to believe there was a large quantity of lead there. He traced the lead himself on the top of the ground for nearly a mile. The difficulty was to get capital. He joined the board recently, and he believed that it was fortunate for the company that he became a director, for if he had not advanced money by cable the necessities of the miners were so great that he believed the mine would otherwise have been taken by the Newfoundland Government.

Mr. MARSH thought if the Government had taken the mine the shareholders might have been saved a good deal of trouble. It was very clear now that the company must be liquidated.

The CHAIRMAN, in reply to questions by Mr. Merriman, said the date of the last advices from the mine was on Feb. 14, when there were 60 tons of ore at the surface, and 59 men at work; but advances had been made on those 60 tons of ore by Messrs. Harvey, of St. John's. The salary of Capt. Bradley was 600*l.* a year. He had no perquisites besides, and his engagement expired in August. The litigation of the company comprised only one suit in Chancery by Mr. Surtees. The company had no suit as plaintiffs. The mine had been mortgaged to Col. Feilden, who had advanced money at various times.

The SOLICITOR said that the first 4000*l.* advanced by Colonel Fielden was advanced on the joint and several bonds of the directors as collateral security, and afterwards Colonel Fielden took a legal mortgage.

Mr. MERRIMAN said there would be two resolutions, he understood, placed before the meeting, one for voluntary liquidation, and the other appointing three of the directors as liquidators. He agreed that a compulsory winding-up would be costly and dilatory. At the same time, he must speak plainly in the interest of his clients upon the propositions of the board. He had in his possession letters in which the gravest and most specific accusations short of downright legal criminality were levelled at the board.

The CHAIRMAN called on Mr. Merriman to read the letters.

Mr. MERRIMAN said he would do so if challenged, and give copies of them to the board if wished, but he thought a general statement would save time. These letters exhibited a great dissatisfaction, which the board ought to seek to remove. He would not himself endorse those letters further than this—that the contents of the prospectus had not been realised, inasmuch as the board pledged itself not to part with the money until they had investigated the statements made to them. He knew that great discontent prevailed amongst the large body of shareholders, who desired that the matter should be ventilated a little in the public press, and he thought this meeting ought to be adjourned, though he was not going to press it, in order that as much information as possible might be elicited, and he was glad to see that one independent journal—the *Mining Journal*—had expressed its intention of reporting to-day's proceedings. He thought that as the property was believed to be of very considerable value the board ought to explain in detail what had become of the money spent, otherwise they were asking the shareholders to take a "leap in the dark." The board, no doubt, as was stated at the last meeting, had been deceived, but this waste of the money was a matter that ought to be enquired into, and he believed that the directors would be bound to return the money spent in stores and in farming, which business they had no right to go into.

The CHAIRMAN said the board did so by the simple right of necessity. The mine was in a desert, and if they had not fed the men from their own stores they would have starved.——Mr. MERRIMAN said no doubt that work was a very benevolent one, but when the concern was bankrupt the board should not ask the shareholders to take the cost of benevolence and kindness on their own backs. This was a matter for the liquidators, but how would the liquidators act if they were chosen from the board?

Mr. WALKER said, as he was to be proposed as one of the liquidators, he might inform the meeting that he, like Mr. Vail, had only been on the board about six weeks, and he thought Mr. Merriman was out of order in accusing him of squandering the company's money.——The CHAIRMAN said Mr. Walker was placed on the board as an "outsider" for the purpose of seeing that everything had been done straightforward and correct.

Mr. MERRIMAN said that Mr. Walker's explanation was perfectly fair, but he (Mr. Merriman) was obliged to deal with the policy of the board as continuous. What the directors ought to say was this:—Gentlemen, we have been deceived, and wasted your money unconsciously, but not dishonourably, through persons in whom we placed confidence. There is the property; take it into your own hands, and appoint, on your own motion, a reliable person to realise it as best he can, and deal with us as considerately as you possibly can." If that course had been adopted, the shareholders could have overlooked irregularities. For his own part, he should have suggested Mr. W. J. White, of King-street, as liquidator, because he knew he was an opulent man, and that the Vice-Chancellors always spoke of him in terms of the highest praise; but, together with the liquidator, he would have a consulting committee, and he would also have the liquidation carried out under the supervision of the Court of Chancery, so that the liquidator might feel he had to act under some responsibility to the Court. Such a liquidation would be cheaper and speedier than a compulsory winding-up by the Court. There would be various questions involved in the winding-up, all of which would have to be investigated, and he thought they would be hardly able to ask Mr. Walker, who came to the board late, to take his co-directors by the throat and make them disgorge.

Mr. WALKER: Most decidedly I should do if I saw anything wrong. I have come in as an independent director, and will not lend myself to a swindle by any party.——Mr. MERRIMAN: We are not talking about swindling.

The CHAIRMAN: You spoke of irregularities.

Mr. MERRIMAN: You admit them, I suppose.——The CHAIRMAN: Not one.

Mr. WALKER: The liquidators would not sell the property without consulting the shareholders.

Mr. MERRIMAN then repeated that it would be unreasonable to suppose that the directors would be inclined to investigate strictly all the questions that ought to come before them, and concluded by asking whether the board would consent to a voluntary winding up under the supervision of the Court; if so, he should advise the shareholders to vote for it.——The CHAIRMAN: No.

Mr. MERRIMAN said in that case he would divide the meeting.

The resolution proposed by the CHAIRMAN was then put, and lost, 8 voting for it and 13 against; but on a poll it was carried by 691 against 344.——Mr. MATHEWS stated subsequently that he ought to have added to the board's proxies 296 more.

Mr. SEROCOLD then proposed that Sir A. Malet and Mr. John Walker be appointed the liquidators, with power to employ a solicitor and accountant. He said he was an original director, and paid 500*l.* in cash for his shares, that he had attended 40 meetings, and never received a shilling for it, or anything for promotion money, that his friends and relatives had bought shares to the extent of 700*l.*, that he was not ashamed of anything which the board had done, and that his desire was to search out any blame if it existed, and to have a thorough investigation. He announced that Col. Feilden had consented to his name being withdrawn from the resolution.——Mr. VAIL seconded the motion.

Mr. MERRIMAN objected to the nomination as liquidators of anyone who had had anything to do with the management of the company.

The CHAIRMAN said if it was thought that he had put himself forward it was a great mistake, for it was entirely against his own wish, and he only submitted to the judgment of his colleques, who thought his name might be useful. He should take very little part in it, as he was not a man of figures, but should delegate his duties to his colleagues and the accountant.

Mr. MERRIMAN said if it was necessary to have the work performed by directors he should prefer the Chairman himself as the most experienced of the board, but he thought the liquidator ought to be wholly independent of the board, and under the control of the Court.

Colonel FIELDEN said he was not present at the last meeting owing to a pressing engagement, but he had given a close attendance to the affairs of the company during the four or five previous months. He was sorry that the meeting had been led away to-day by false argument. The question had not been put fairly before the meeting. The directors were, no doubt, responsible for what had taken place, but as far as had been possible all the facts and statements had been given to the shareholders. If the shareholders, however, would not come forward and carry on the mine, and raise another 15,000*l.* on debentures, there was no other course but to liquidate, and the most reasonable course was a voluntary liquida-

tion. Who were more likely to be the best liquidators than those most interested in the company? It was his wish to have been one of the liquidators, for he held 965 shares, and he believed he was the largest sole proprietor of the company. It was not because he was the mortgagee of the mine that he desired to be one of the liquidators, but because the best that was possible should be done for the shareholders. Mr. Walker had been chosen as a liquidator because at the last general meeting it was felt that an "outsider" ought to be put on the board, to see, on behalf of the shareholders, that all was straightforwardly and honestly conducted. The appointment of Mr. Walker would be satisfactory in that respect, for he knew him to be an honest and honourable man. Under these circumstances he (Colonel Fielden) was willing that his own name should not be included in the resolution. He protested, however, against the expense of an official liquidation.

In reply to Mr. Merriman, the CHAIRMAN said no offer had been received for the purchase of the mine, and no offer had been made by the board to anyone. It would now be for the liquidators to prepare a scheme of reconstruction if necessary.

After some more discussion,

The CHAIRMAN said it had been asked whether the board would object to an "outsider" being included amongst the liquidators, and the name of Mr. Julius Marsh had been suggested. There would be no objection to appoint Mr. Marsh if the shareholders desired it, and he would include his name in the resolution.

Mr. MERRIMAN drew up an amendment, which was proposed by Mr. EAST, and seconded by Mr. HEATHCOTE—"That Mr. W. J. White, of 33, King-street, Cheapside, be appointed liquidator of the company." The amendment was carried by 9 to 8 on a show of hands, but was negatived by the proxies.

The resolution of Mr. SEROCOLD, appointing as liquidators Sir A. Malet and Mr. J. Walker, and adding Mr. Julius Marsh, with a remuneration of 150*l*. for the three, was then put, and negatived on a show of hands, 8 voting for and 11 against, but on a poll the resolution was declared by the Chairman to be carried.

Mr. MERRIMAN protested against the resolution.

The proceedings terminated with a vote of thanks to the Chairman for presiding.

GREAT WHEAL VOR UNITED MINING COMPANY.

A quarterly general meeting of shareholders was held at the offices, Gresham House, on Wednesday,—Mr. J. O. HANSON in the chair.

Mr. J. J. TRURAN (the secretary) read the notice convening the meeting; the minutes of the last were confirmed.

The report of the committee was read, as follows:—

At the last quarterly meeting, held in December, the committee were able to report that the engine had commenced to work in West Metal shaft, and that 9 fms. had been drained below the adit level. Since then considerable further progress has been made, and by the last accounts from the mine the water was in fork to nearly the 40 fm. level below adit. This has been accomplished not without great attention on the part of the agents, owing to the shaft having been blocked up by old timber, &c., left by the former adventurers. The committee are happy to report that from what has been already seen of the lode there is every reasonable prospect of a good mine in depth. At the 10 fm. level there are large quantities of tinstuff, which can be easily worked, and taken away at small cost. Although tributers are anxious to commence work the committee do not propose to mine either by tutwork or tribute until the bottom of the mine is seen and the prospects of the future more clearly defined. The re-dressing of the tinstuff left about the floors, and more especially the beds of the old stamps, has been proceeded with as much as the quantity of water will allow, and monthly sales may be calculated on to the extent of at least 2 tons, leaving a fair profit. The committee, however, hope before long that by the introduction of additional launders more water may be made available, and thus enable the agents to increase the returns from this source. The following is the financial state of the company this day:—

On the publication of the audited accounts to Jan. 30 there was a balance in hand of		£ 367	1 2
Since which date there has been received—			
For old materials sold at the mines		477	13 10
Tribute on tin sold from leavings		27	9 0
Arrears of calls		2	10 0
Tin sold Feb. 24		91	10 6
,, March 24		94	0 5
Sundry rents, &c.		7	11 2
Total		£1067	16 1
And paid—			
Labour to Jan. 29	£218 11 5		
,, Feb. 27	215 18 9		
On account of merchants' bills in arrear	315 0 0		
Sundries, postage, &c.	4 2 5=	753	12 7
Balance		£ 314	3 6

The actual account stands this day as follows:—

LIABILITIES—Merchants' bills		£ 296	2 2
Lords' dues to December, 1874		10	19 8
On relinquished shares		688	12 1
Salaries, three months		61	0 0
Total		£1056	13 11
ASSETS—Balance as above	£314 3 6		
Arrears of calls	117 0 0		
Old materials sold	108 15 3=	539	18 9
Balance against the mine		£ 516	15 2

From this it will be seen that further progress has been made in the sale of old materials, &c., whilst every endeavour is used to keep the expenditure within the limit contemplated at the meeting held in March, 1874, which, to the credit of the agent, has hitherto been accomplished.

The report of the manager was read, as follows:—

March 30.—During the past quarter we have completed the cutting down of West Metal engine-shaft from the adit to the 10, cleared up the downright part of the shaft from the 10 to the 20, since which we have dropped the lift in the underlie shaft to the back of the 40, and succeded in forking the water to that point. We have also cleared the 20 and 30, both east and west of shaft, which are all extended a great distance on the course of a large, well-defined lode, which will produce a little tin, but I fear not enough to pay for working at the present low price for tin, still I am well pleased with the character of both ground and lode, and if we find a similar lode when we reach the bottom of the mine I shall feel confident of success in our development. Before we drop below the 40 we have to fix plunger at the 20, and fix bob at the 10, bring down main rods, &c.; this we calculate will take three weeks to complete, after which we expect to fork the mine to bottom in about four or five weeks—that is to say, we shall have the mine cleared up in two months from this time. At the old dressing-floors we are making fair progress with the limited supply of water we have to work, but by fixing the plunger lift in West Metal shaft to heave the water to the surface, we shall have an increase of water to the dressing-floors, so that our present returns will be well maintained. We have fixed a good strong 8-armed capstan and sheavs at West Metal shaft, so that we have everything very convenient for fixing the pitwork, &c. The engine and flat-rods continue to work very well.—S. HARRIS.

The CHAIRMAN said—By the reports just read, from the committee as well as that from the agent—the latter received only this morning—you are put in possession of what has taken place since the last quarterly meeting, and also the position of affairs at the present moment as regards the mine, and likewise the financial state of the company. A year has now elapsed since when in March, 1874, it was determined to commence what I may call a new phase of the undertaking; and if we contrast our position to-day with what it was then I think you will consider it is most favourable. Then we were 3000*l*. in debt, and working at a very heavy loss month by month—I think as much as 1000*l*.; and we were somewhat in doubt whether we should really be in a position to carry on the mine or not. Estimates were placed before us, and I am happy to inform you that those estimates, although we have been working for a year, have not been exceeded. Our position to-day is simply this—we have got down very nearly to the 40 in an old mine, from which we propose to work the ground lying west of Edwards's shaft—a piece of ground which all mining authorities tell us offers every reasonable prospect of success. When we attempted to work it from Edwards's shaft we were down to the 174, and we could only work it at a very great loss, in consequence of the exceedingly heavy water charges incurred by working the whole of the sett; and if we can pump the water out from this old mine, which is calculated to be a depth of 70 fms. (it is already nearly down to the 40, and we hope to be down to the bottom by the next meeting), and come upon anything going towards Metal shaft, there is every prospect of doing some good. The report this morning alluded to the lode in the 20 and 30 as not offering any great prospect of success, but the agents have omitted to state anything about the 10 fm. level, where we are informed there is a considerable quantity of tin ground which will pay for stoping, that will help us very materially. We do not propose doing anything by tribute or tutwork until we get to the bottom of the mine—70 fathoms—so as to ascertain what our prospects are likely to be. As far as we can judge we shall have money in hand to do that—therefore, although you hear there is a liability against the mine of something like 500*l*., I ought to tell you that includes the liability upon those shares which have been relinquished, numbering 1217. Those conversant with the proceedings of the company in August last will remember it was unanimously agreed to authorise the making a call if necessary to pay off the claims due upon those shares—although that call has not been made yet, the liability has been included, and notwithstanding that the total indebtedness against the company is merely 516*l*., against which we have two engines yet unsold. On the whole, therefore, I think you will consider our position very satisfactory. This company is in the peculiar position that its shareholders have all the accounts and all the information up to the very day of the meeting, by which you know everything before leaving the room, and how things are going on, but at the same time I shall be glad to reply to any question shareholders may desire to put.

Mr. HORNCASTLE enquired the computed value of those two engines?—The CHAIRMAN: About 500*l*. or 600*l*. If they wound up to-day they would pay off this liability. Those were the spare engines; there were three others for working the mine, which would be retained.

Mr. WILDE asked if the levels between the 40 and the 70 were very extensive?—The CHAIRMAN said it was not yet known. It was believed they would be in the 40 to-day, and they hoped to see the bottom of the mine within two months.

Mr. TRURAN mentioned that there were no plans or records of the mine.

The CHAIRMAN said it was situated to the extreme west of any workings that this company had carried out.

Mr. TRURAN added that there were men now working in the mine who gave verbal information to the fact that it had been worked to the 70, and such information could generally be depended upon.

The CHAIRMAN said all operations had ceased at Edwards's shaft. One of the reasons why the mining authorities based their opinions upon this ground being likely to prove so productive was that it was parallel to the Old Wheal Vor, and lay between the two same cross-courses where such astonishing returns had been yielded. It was one of the richest tin districts in England, perhaps in the world, and the property had been worked more or less ever since the days of Queen Elizabeth. One could hardly suppose there was not yet some riches unwrought. Their cost was now very light, not exceeding 200*l*. per month, and they had realised large profits when tin ore was selling for about 45*l*. per ton, and operations were being carried on at a much greater depth than now. The present lease had 21 years to run, and it was renewable.

The accounts were then passed and allowed, and, with the reports, ordered to be entered on the cost-book.

Mr. WILDE had much pleasure in proposing that the committee of management be re elected, and added that the grateful thanks of the shareholders were due to those gentlemen for their having so successfully steered the company through its past troubles, and he only hoped success would reward their exertions.—Mr. HORNCASTLE seconded the proposition, which was put and carried unanimously.

Mr. W. MOATES was re-appointed auditor.

The CHAIRMAN said notice had been sent to those shareholders whose shares were in arrear of call. Many of the amounts were small, and some of the holders lived in France, and one in Australia. The number of shares was 163, and the amount owing was 117*l*. Mr. Childs, the solicitor, suggested that a resolution should be passed declaring such shares absolutely forfeited, and that the same be carried to a forfeited shares account, to be sold or otherwise dealt with, as the committee deemed expedient.

Mr. HORNCASTLE enquired if those shares were declared absolutely forfeited, and indulgence was afterwards given to such of the holders as paid their arrears, whether it would do away with the legal decision of forfeiture?

Mr. R. W. CHILDS (the company's solicitor) explained that the Stannaries Act, 1869, provided that before shares could be forfeited notice must be given to the effect that unless the calls be paid by a certain date they would be forfeited. The next step was a notice must be given that a meeting would be called for the purpose. The Act of Parliament then says that the shares were to be carried to the forfeited shares account. If, after the necessary resolution had been passed, any shareholder came to the commitee and could prove that by inadvertence the calls had not been paid, he presumed that by paying a penalty of (say) 5 per cent. the shares would be restored. The shareholders had no right whatever to the shares, and he assumed if the mine should become reasonably successful they would become an asset as well as the relinquished shares.

Mr. WILDE asked if there were any other shares besides those now about to be forfeited?—The CHAIRMAN said there were 1217 relinquished shares, which they could sell by-and-bye; they were vested in the company. There was no power to deal with those shares except by a vote of the shareholders.

A SHAREHOLDER suggested the advisability of offering them to the present shareholders.—The CHAIRMAN said that nothing would be done without consulting the shareholders.

It was then unanimously resolved "That all shares upon which any call or calls now remain due, and in respect of which notice of liability to forfeiture has been given, pursuant to the Stannaries Act, 1869, be and are hereby declared forfeited, and that the same be carried to the forfeited shares account, and be sold or otherwise dealt with or disposed of as the committee shall deem expedient."

Mr. WILDE moved—"That the best thanks of the shareholders be given to the Chairman and committee for their continued and successful attention to the business of the company."

The proposition being duly seconded, was put, and carried unanimously.

The CHAIRMAN, on behalf of his colleagues and himself, begged to thank the shareholders for this continued mark of their confidence. The committee had the same interest in the success of the company as the shareholders, and he could only say that, as heretofore, they would leave no stone unturned to bring the undertaking again into a prosperous condition.—The meeting then separated.

WEST JEWELL MINING COMPANY.

THE ordinary general meeting of shareholders was held at the offices, Gresham House, on Wednesday,

Mr. MATTHEW GREENE in the chair.

The notice convening the meeting having been read,

The CHAIRMAN proceeded to lay before the meeting an account of the operations it had been deemed advisable to pursue since the suspension of work in the eastern part of the sett, and the success which had attended those operations. He said it was doubtless in the recollection of the shareholders that a grave mistake was made by the former manager, who had probably been led away by the statements of the old miners that a good course of tin had been left by former workers. In the heavy operation of erecting a 50-inch cylinder engine, and in doing what was worse than sinking a new shaft—cleaning up an old one—the larger portion of the working capital was unfortunately consumed. It must, however, not be forgotten that had the works been directed to developing the western ground, from which at shallow levels 8000*l*. worth of tin has been sold, we should undoubtedly ere this have been in the position that the indications warranted, and which certainly the outlay and patience of the shareholders so well deserved.

The CHAIRMAN stated that he thoroughly believed in the ultimate success of the mine; and, with regard to the debt due from the company to him, he was most anxious to meet the shareholders in the very best spirit, his mind being quite made up that a good mine was only awaiting the necessary development to yield substantial profits. As a material proof of his unabated confidence, he would submit the following proposition. The debt due to him was about 4000*l*., and he was prepared to take the whole amount up in shares, if the shareholders would come forward and subscribe for the 3000 unallotted preference shares. This would be an easy task for proprietors to do; it was only an average of 15 shares each. It would, indeed, be a fatal policy for the proprietors not to come forward and subscribe the additional capital to work a property that possessed any and every indication for making a rich and prosperous mine. The district was unequalled for its riches, and he (the Chairman) felt sure success would certainly attend the enterprise, if vigorously carried on. That was a most important fact referred to in the manager's report that in the western ground a shaft had been sunk, and a lode met with that only required to be opened on to prove its value. The specimens on the table before him were inducement enough to him (the Chairman) to continue.

The balance-sheets, showing the company's transactions from the commencement of operations to the present date, and the following report from the manager were read. The accounts presented showed, presuming the whole of the capital had been subscribed, a balance in favour of the company of 6000*l*.

MANAGER'S REPORT.

I herewith hand you the following report on the position and prospects of this mine. Since relinquishing operations at the shaft, which was unfortunately cleared up and sunk to the depth of 114 fms. from surface by my predecessor where the lode was not found to be rich for tin, I felt that it would be—looking at the fine run of ground to west—prudent to sink a new shaft in the western ground. This has been done at a point about 220 fms. west of the old shaft; and I am well pleased to inform you that at only 22 fms. from surface a rich tin lode has been cut, such as fully justifies me in recommending you to at once erect a steam-engine and open on the lode with all possible speed. The specimens which accompany this report will, I feel confident, be pronounced by any competent miner to be equal to anything discovered at a similar depth in this famous district, and there is doubtless a large body of tin underneath our present operations in this part of the mine. Although quantities of tin sufficient to make this mine a success have not yet been sold, still 8000*l*. has been raised from the same lode, which I feel satisfied is only a very small proportion compared with the amount I fully expect this lode will produce, if properly worked, in the new shaft above referred to. The next point that I will direct your attention to is the operations that have been carried out on a parallel lode about 100 fms. south. Here we have sunk a shaft to a 27 fm. level, where we have lodes producing good tin, which can be worked very cheaply without the aid of any pumping machinery, this part of the mine being drained. The third point I wish to lay before you is the pleasing fact that the lode now opening up so well in the adjoining mine (Cathedral) runs directly through this mine, and in the western portion of the property is, I believe, only waiting the pick of the miner to lay open a good course of copper ore. Depend upon it, if the lodes in West Jewell are developed, the most satisfactory results will be achieved.—JOSEPH MICHELL.

A SHAREHOLDER asked how deep the new shaft was?—Capt. MICHELL, the manager, replied that it was sunk 22 fms., and the lode at that point was exceedingly good, and offered every inducement to be vigorously worked.—Mr. MURRAY said he had seen a very good lode cut in an adjoining piece of ground parallel to West Jewell.

The CHAIRMAN said this discovery of copper at Cathedral Mine had added considerably to the value of West Jewell. The lode cut in Cathedral was as close as Cheapside is to Cornhill, and there could be no doubt that the value of the property was greatly enhanced by this discovery. Whatever became of the mine he intended to stick to it until he regained the money he had invested, and a good deal more. If he had not had great confidence in it he would not have advanced the large amount of money which was owing to him.

In reply to a question, Capt. MICHELL said the specimens exhibited would fetch 25*l*. per ton.—Mr. HITCHINS asked how deep the deep adit level would be.—Capt. MICHELL said about 70 fms.

The CHAIRMAN said there was a suitable engine in the neighbourhood which could be bought cheap. He was quite willing to merge his interest with that of the shareholders if the money was subscribed. There was no doubt they had a great quantity of tin; out of tributers' tin sold the profit was not far off 40 per cent. The heavy expenses took away the profits. Engines erected, and all sorts of expenses were gone to for nothing by the ill-advised former manager.

Mr. MURRAY said that at present prices deep mining in Cornwall would not pay, but such mines as West Jewell would pay well.

Mr. MURRAY remarked that a great change had taken place in the granite, which was now much softer. In a neighbouring mine they had sunk a similar shaft, and the results were most satisfactory. They value their lode at 12*l*. per fathom, and the granite in West Jewell was very similar.

Mr. HITCHINS said the specimens were remarkably good ones. About 90 years ago a very celebrated discovery was made, and large fortunes were realised by working a lode similar to this one, called Messer's Bottoms. The depth did not exceed 40 fathoms, which was very shallow. It seemed to him that the only practical way to look at this mine was to do what the Chairman had so properly suggested. He had lately been over the ground, and he noticed a great similarity between the rock there and at Messer's Bottoms, and there were more than ordinary indications of a good mine, although it would not be right to make a premature calculation. He believed that 2000*l*. would establish the mine in a permanently profitable position. He thought the offer of the Chairman a very liberal one, and if his means would permit of it he would certainly have a good slice in it. The Chairman said if the shareholders subscribed 2000 of the unallotted preference shares he would consent to take 2000*l*. worth of shares, and let the remainder of debt remain until they could pay it, or if they subscribed the 3000 he would take the whole of his debt in shares.

A SHAREHOLDER asked how far the lode in Cathedral was from the point where the shaft was being sunk in West Jewell?—Capt. MICHELL said, in reply, it was a parallel lode to theirs.—After a few other remarks, the CHAIRMAN proposed the reception and adoption of the reports and accounts.—Mr. RICHARDSON seconded the proposition, which was unanimously agreed to.—The CHAIRMAN then said, with respect to his proposal, it was a matter of great importance that the mine should be carried on properly.—Mr. COMYNS expressed his appreciation of the disinterested offer of the Chairman, and he was quite prepared to take 50 preference shares.

Messrs. Greene, Murray, and Freeman were elected as the directors.

The CHAIRMAN then proposed that the remaining 10s. on the 2000 preference shares already subscribed be paid up, making them 2*l*. paid.—Mr. FREEMAN seconded the motion, which was carried.

Messrs. Johnstone, Wintle, Cooper, and Co. were authorised to audit the accounts.

The CHAIRMAN then said a circular would be sent to each of the shareholders with respect to his proposition.—The proceedings then terminated with a cordial vote of thanks to the Chairman and manager.

ROSSA GRANDE GOLD MINING COMPANY.

An adjourned general meeting of shareholders was held at the offices, London Wall, on Tuesday,—Mr. LLOYD FOSTER in the chair.

Mr. DAWSON (the managing director) read the notice convening the meeting.

The CHAIRMAN stated that this meeting was simply an adjournment of the meeting held in August last. There had been more than one adjournment, in consequence of the resolution passed authorising the directors to obtain a report upon the property from some good authority. He then referred to the fact (which was mentioned at the last adjourned meeting) that Mr. Gordon, of the St. John del Rey Company, had declined to report upon the property in the present embarrassed condition of the company, and suggested that the business of this meeting should be finished, and that another meeting should be convened to consider what course should be adopted for the future.

A SHAREHOLDER thought a larger number of shareholders than those present were not likely to attend another meeting.

The CHAIRMAN said it would be necessary to call the shareholders together again in order to pass a resolution either to wind up the company or to decide on what course should be adopted. Since the last meeting the directors had put themselves in communication with Mr. Wendeborn, who was the next best authority in Brazil to Mr. Gordon. Mr. Wendeborn went to the mines, upon which it was found there was a large amount of debt owing, money having been advanced by Signor Grillio, and also by Mr. Gordon. He (the Chairman) still believed it to be a very valuable property for grazing purposes only; out of the last call they had paid off all the debts, and supposing all the calls were paid there would be left some 1500*l*. to 2000*l*., and in order to retain the property in their hands he should suggest that instead of dividing that amount—which would not exceed 3d. to 4d. per share—as little expenditure should be made upon it as possible, sufficient only to preserve its legal possession; by this means they would, he believed, be able to retain it until it became of value. He believed there was a very great desire to try to wreck companies, and get the properties into their own hands at a very small price. He had never bought nor sold a share since he first became connected with the company, and if he could carry it to a success he should be very pleased.

A SHAREHOLDER enquired the extent of the property?—The CHAIRMAN said it was about six miles.

A SHAREHOLDER asked if it could not now be sold for something?—The CHAIRMAN said they were obliged to protect their mining rights by keeping men at work. If it were kept as a pasture it might possibly pay its expenses. As a grazing property it was said to be worth 4000*l*. to 5000*l*., supposing they had the right to sell it.

Mr. DAWSON (managing director) explained that they were bound to reserve the mineral rights in order to retain the grazing rights.

The CHAIRMAN did not suppose for a moment that either Signor Grillio, or any other gentleman out there, had formed any combination to purchase the property, but such things were sometimes done, and he would do all in his power to prevent it in this case.

A SHAREHOLDER had heard a great deal of what might be called gossip, causing an enormous amount of suspicion. He had been told that Mr. Gordon had sent over to this country to buy a large number of shares, as he intended to make a good report, but all at once he would not make a report—those statements naturally created a certain amount of suspicion.

The CHAIRMAN said that Mr. Gordon was the British Vice-Consul out there, and a man of very high standing in the country, and he (the Chairman) did not believe Mr. Gordon would do anything of the sort.

A SHAREHOLDER asked if Mr. Gordon held any shares in the company?—Mr. DAWSON said Mr. Gordon's name was not on the books.

The CHAIRMAN said when Mr. Wendeborn went up to the mine he was not allowed to see the books, and although he stayed there a week had not sent home any report whatever. Every servant of the company had been dismissed three months since.

Mr. ATTRILL asked what funds would be required to keep the thing going?

The CHAIRMAN said after paying off all the debts there would be about 1000*l*. in hand, and that would last for some time. He confessed his opinion had altered as regards the value of the property as a mine, but he believed it to be valuable as a grazing property.

Mr. ATTRILL regretted they did not end it when Capt. Williams, nine years ago, came home and told him—which was now verified—that it might pay its expenses, but he much doubted even that. He (Mr. Attrill) should have had confidence in Mr. Gordon's report, but Mr. Wendeborn goes up to the mine, and stays there a week, without making a report. He thought the sooner the company was brought to a close the better. They were now told the property was a valuable grazing one, and if so, why had not the directors utilised it during the past years?

The CHAIRMAN said the property could only be used for grazing purposes upon a large scale; it had hitherto been used only as feed for the company's mules. He most strongly objected to sell their property for a few thousand pounds, upon which they had expended 100,000*l*.

Mr. DAWSON explained that the term grazing did not apply to this land as in England. He did not believe they could do any more than grow Indian corn; but as the railway was nearing the property it must of necessity become of increasing value. The railway was being continued through the interior of the country, and within the next ten years land now selling for 100*l*. would be worth tens of thousands. As to Capt. Williams, he had had no opportunity of judging whether the Bahu was or was not a valuable mine, as it had been opened by this company by the present directors subsequent to Capt. Williams's return to this country. Referring to Mr. Wendeborn, he mentioned that upon his arrival at the mine he found one of the creditors, Signor Grillio, in possession of the store and office, but had no objection to Mr. Wendeborn examining the property, but Capt. Dale, who was in charge, left to consult his solicitor, refusing Mr. Wendeborn to inspect the books, and promising to return the next day. Capt. Dale, however, did not return, and Mr. Wendeborn, after waiting for a week, left without inspecting the property.

The CHAIRMAN, in reply to a question, stated that the expenses at the present time were *nil*, both himself and Mr. Dawson having consented to give their services.

Mr. DAWSON said that at Gongo Soco privilege had been given to some local miners to scratch the surface, for which they paid a royalty, and probably some arrangement might be made with them to do such work as was necessary to protect the mining rights without cost to the company.

After some further discussion, it was unanimously decided that if the expenses should exceed 150*l*. per annum a meeting should be immediately called.

A vote of thanks to the Chairman closed the proceedings.

THE STEPHEN ROE DIFFUSIVE DAYLIGHT REFLECTOR COMPANY (LIMITED).

The first ordinary meeting of shareholders was held at the Clarence Hotel, Manchester, on Monday (Mr. ROBERT COOKE, Chairman of the board of directors, in the chair). The SECRETARY having read the circular calling the meeting produced a balance-sheet of the receipts and expenditure, from which it appeared that there was a balance at the bankers sufficient to carry on the concern without making any further calls upon the shareholders.

The CHAIRMAN said he was glad to meet the shareholders at this their first meeting, and to be able to say that the progress of the company, though slow, was steady, and, on the whole, satisfactory. It was quite true that much more work might have been done, but it must be remembered that in all new undertakings there were many difficulties to be overcome before a great success could be reported. They were, however, in a position which few young companies could rarely boast of—they had a balance at their bankers sufficient to carry on their business without making further calls upon the subscribers. This he attributed to the very judicious and economical management with which their operations were carried on, and he hoped at no distant day to be able to declare a dividend, which would be very satisfactory to the promoters and shareholders of the company. Since the property came into the possession of the company very great improvements had been made in the manufacture of the reflectors—improvements which were absolutely magical, and that, too, at a much reduced cost to the proprietors; indeed, he might say that the means of collecting daylight and diffusiving it into dark rooms were almost perfection. By means of these reflectors very dark and absolutely useless rooms were rendered light and cheerful, the use of gas in daytime entirely abolished, and the health of the occupants materially improved. In some cases, he said, the whole cost of the apparatus was, by the saving of gas, covered in one season. There was another point of view in this matter which ought not to be overlooked—whilst they were all anxious to get a good return for their money invested, they ought not to forget its beneficial effects on the health of children and other persons who were in a large number of cases doomed to the noxious influence of gas during the whole day. He wondered why this invention had not long before this attracted the attention of philanthropists and sanitary reformers of the present day. He concluded by moving the adoption of the report, which was carried unanimously.

After a vote of thanks to the retiring directors and the secretary, they were re-elected, some formal business was transacted, and the proceedings terminated with a vote of thanks to the Chairman.

[For remainder of Meetings see to-day's Journal.]

CONCRETE PIPES AND DRILLING ROCKS.—The invention of Mr. J. W. STOCKWELL, of Portland, Maine, embraces improvements in apparatus for moulding concrete pipes, parts of which apparatus are also applicable to the drilling of rocks, and other like purposes, and relates to that class of moulding machines for the production of concrete pipes in which the pipes are formed by ramming or packing, by self-acting means, the cement or material of which they are composed between the external surfaces of a central or internal core and the internal surfaces of an outer casing or mould; and consists chiefly of an improved appliance for performing the above operations, and of a peculiar mode of operating the same,

which improvements admit of the pipes being manufactured with greater facility than heretofore. The invention also embraces certain improvements in the mould and core and other details of the apparatus.

FOREIGN MINING AND METALLURGY.

Copper has given rise to few transactions at Paris, and there is scarcely any change to note in prices. Chilian in bars, delivered at Havre, has made 85*l.*; ditto ordinary descriptions, 84*l.*; ditto in ingots, 90*l.*; English tough cake, 88*l.*; and pure Corocoro minerals, 86*l.* per ton. The Havre copper market does not revive from the torpor which has for some time characterised it. At Marseilles copper has experienced a rather sensible decline, in consequence of the suspension at London of an importing house. There is little to note as regards copper upon the German markets; transactions have only responded to the requirements of consumption. Banca tin has advanced to 53½ fls. at Rotterdam, but buyers have generally refused to pay this high rate, and have concluded as few transactions as possible. There have been very few transactions to note in Billiton. At Paris, Banca, delivered at Havre or Paris, has made 97*l.* 4s. per ton; Straits ditto, 93*l.*; and English, delivered at Havre or Rouen, 92*l.* per ton. The German tin markets have hardened to some extent. The Paris lead market has remained inactive; French lead, delivered at Paris, and Spanish lead, delivered at Havre, have brought 21*l.* 16s. per ton. The German lead markets have generally ruled firm. There has been an advance in zinc at Paris; Silesian, delivered at Havre, has made 24*l.* 12s.; other good marks, delivered at Havre, 24*l.*; and ditto at Paris, 24*l.* 2s. per ton. The German zinc markets have been pretty well supported.

The orders which are given out at present in the Belgian iron trade are still of scarcely any importance. The delivery of (say) 15 tons of iron is now looked upon as quite an important event. Never, it is stated, has Belgian metallurgical industry been reduced to a condition of greater depression. As is usually the case, some privileged works are an exception to the general rule, but most of the Belgian establishments foresee with uneasiness the approach of the moment when it will be necessary for them to dismiss their working staffs. Already the Chatelineau and the Acoz Companies have announced their intention to discharge on the 1st proximo all the workmen of one rail-mill and one rolling-mill producing merchants' iron; as a necessary consequence, they are also preparing to blow out one or more of their blast-furnaces. Other establishments will soon have to follow the example of Acoz and Chatelineau if orders do not promptly reach them. Industrials, under such circumstances as these, are beginning to turn longing eyes towards the Belgian Minister of Public Works, and they are devoutly hoping that that high functionary will see fit to come to their aid; certainly he might do business at present upon very advantageous conditions. Both in the Luxembourg and in England pig has been falling; the proprietors of the Belgian works have been obliged to reduce their rates accordingly. Rolled iron remains without any material variation in Belgium, and it is not likely to fall much lower, since ironmasters have carried practicable concessions to the furthest possible limits; further abatements can only be made with the aid of an important reduction in wages, and a fresh fall in the price of industrial descriptions of coal.

The French iron trade is far from showing animation, but we must not draw conclusions too hastily from this fact, since the spring has now arrived, and an improvement in business is usually witnessed at this period of the year. Upon the Paris market, although affairs do not exhibit much vigour, quotations display at the same time a little more firmness. The Providence Company and MM. Dupont and Fould have issued a circular fixing the price of merchants' iron at 9*l.* 4s. per ton. Construction plates have not followed this slight advance, and remain at 11*l.* 16s. per ton. M. Victor Doré, of the Mans, has obtained a contract for 660 tons of pipes of various diameters at 10*l.* per ton. Rough pig is quoted in the Luxembourg at 2*l.* 16s. 3d. per ton. In the Meurthe-et-Moselle pig for refining is held at 3*l.* 0s. 10d. per ton. In the Haute-Marne quotations for iron have not experienced any sensible variations. In the Nord first-class iron is held firmly at 8*l.* 16s. per ton. In the basin of the Rhone the state of affairs remains much the same; first-class iron is held with firmness at 8*l.* 16s. per ton. The large boiler works and mechanical construction establishments are working with activity. The Creusot Works are making experiments with a new description of Algerian minerals, with which it is said to be practicable to produce steel superior to the steel hitherto used in the manufacture of cannon. Creusot is never backward when improvements have to be considered. An official return shows that in 1873 the Nord produced 211,300 tons of iron for plates, and the Loire 10,100 tons. In the same year the Loire produced 65,700 tons of steel. It was stated recently that the Terre-Noire Company had purchased the Martin patents for the manufacture of steel. It appears, however, that it is MM. Schneider and Co., of Creusot, and not the Terre-Noire Company which has made the purchase in question.

Transactions in the French coal trade present about the same importance as hitherto; the markets exhibit, however, a little heaviness in consequence of the accumulation of stocks. The struggle continues between coal owners and coal consumers, but it appears probable that the latter will attain their object, and obtain some further reduction in prices. The obstinate resistance of the coal owners has, meanwhile, almost paralysed the efforts of the French metallurgical interest. To prevent a further accumulation of stocks, some of the mines are reducing their working hours; it is a question whether their owners would not have shown more wisdom if they had concluded contracts at reasonable rates, and sought by all possible means to increase rather than to diminish the extraction of their mines. A decree of the President of the French Republic authorises the Marsange Coal Mines Company to establish a branch to unite its workings to the Brivade and Alais Railway. The total imports of coal and coke into France in the first two months of this year are officially returned as follows:—Coal, 952,240 tons; coke, 52,580 tons. These imports are larger than those of the corresponding period of 1874, but smaller than those of the corresponding period of 1873. An official return shows that in 1873 the Loire produced 3,821,200 tons of coal; the Nord, 3,071,972 tons; and the Pas de Calais, 2,978,600 tons.

The Belgian Coal Trade has remained quiet. The annual migration of working brickmakers to Germany and France has commenced; it is likely to attain considerable proportions, and may affect the production of certain collieries of the Hainaut. In the Liége and Charleroi basins prices remain without much variation. Unwashed coke is quoted at 1*l.* to 1*l.* 1s. 8d. per ton, and washed coke at 1*l.* 8s. to 1*l.* 10s. 6d. per ton.

A SPANISH EL DORADO.—A correspondent, writing from Linares (March 24), says:—"Everyone is aware—and many to their cost—that Spain is one of the poorest countries in Europe, but few are acquainted with the extent of its supply of valuable metals. Wishing to break the long journey from Madrid to Seville I happened to select this town as a convenient half-way resting place. It has nothing of the dirty and ugly appearance of an English mineral district—in fact, cleanliness is rather overdone in the shape of whitewashing, adding thereby to the already sufficient glare of the sun. The mines themselves are amongst the green corn fields in the outskirts. Tall shafts with engine-houses are sprinkled about as far as the eye can reach, the range of the Sierra Morena forming the dark background to the scene; but there is nothing else to show the nature of the great industry of the place. Strings of mules and donkeys, and carts also, apparently lightly laden, hardly gave one an idea of the quality or value of the produce of the mines, which is being dispatched to the station at a league's distance. The only wonder is that our practical countrymen, with their large interest in the district, have not constructed a short line of railway running all through it in connection with the main line. England is worthily represented in the person of her Vice-Consul, Mr. Thomas Sopwith, C.E., under whose charge are some of the chief and most remunerative mines. Indeed, there is more of English capital invested in the district than of Spanish, French, and German put together. The lead ore is of excellent quality, and is prepared by machinery to a percentage of 75. Nearly all the produce is smelted on the spot. The proportion of silver is 10 to 18 ozs. per ton. The coal used is principally Spanish, from the neighbouring mines of Belmez and Espiel. There are 7000 men employed in the mines and in the smelting works, the wages being from 2s. 6d. to 4s. per day. Nearly all the work being paid for by contract, the objection of the miners to work on the innumerable feast days is obviated. Almost all the captains of the mines, both Spanish as well as English, are our Cornish countrymen; in fact, the whole place has the appearance of one of their mining districts, the swarthy complexion of the workpeople and their picturesque dress excepted. No less a sum than 1000*l.* a-day is expended here by the English companies alone. The whole of the United Kingdom produces 98,000 tons of lead per annum. Linares alone yields 65,000 tons, and it is more valuable lead than English on account of the larger proportion of silver it contains. These figures will give some idea of the extent of this great industry, and our interest in it. One mine alone gives 7000 tons per annum, and several produce upwards of 5000 tons. Not the least interesting fact is that the companies pay dividends varying from 12½ per cent. to 100 per cent.; a veritable El Dorado, therefore, is Linares. The workpeople look healthy enough. The English have a doctor of their own, and this may go some way to account for their appearance. They also have a chaplain, and have never had reason to complain of religious intolerance. The population is extremely liberal in its political opinions; this most probably arises from association with foreigners. I cannot do better than close this letter with the Consul's remarks in his report, presented to Parliament in 1873, in which he says—'So boundless are the splendid natural resources of this part of Spain, that political agitation and the revolutionary tendencies of the people, which in any other country would be utterly ruinous to trade and enterprise of every sort, have failed to stay the onward march of these provinces in their brilliant career of commercial, industrial, and agricultural prosperity.'"

FROZEN MINES.—The remarkable frozen mines of Colorado are described by Mr. R. Weiser, of Georgetown, in that territory, in a communication to "Silliman's Journal." One of them is the Stevens Mine, at a height of 12,500 ft. above the level of the sea, in Clear Creek county. At a depth of from 60 to 200 ft. the lode or vein of silver ore, as well as the surrounding rock, was found to be frozen solid. "There are no indications of a thaw summer or winter; the whole frozen territory is surrounded by hard, massive rock, and the lode itself is as hard and solid as the rock. The miners being unable to excavate the frozen material by pick or drill to get out the ore, found the only way was to kindle a large wood fire at night against the back end of the tunnel, and thus to thaw the frozen material, and in the morning take out the disintegrated ore. This has been the mode of mining for more than two years. The tunnel is over 200 ft. deep, and there is no diminution of the frost; it seems be rather increasing." The writer cannot account for the occurrence of this frozen mass so far underground, except on the hypothesis that the frost penetrated to that depth during the glacial epoch, and has remained there ever since. It could not have found its way thither from the outside while the region was subject to any such climate as now prevails there.

DYNAMITE.

Shortly after its discovery by Sobrero nitro-glycerine in its liquid form was demonstrated to be the most powerfully explosive substance known; and its value as a mining agent was established in Sweden, Germany, and California. Large quantities of it were also imported to this country, and employed extensively in the Welsh quarries, where the economy in time and labour effected by its use in blasting and tunnelling in hard rock gained for it a high reputation. For use in vertical borings there is no explosive agent so easy and effective in application. The miner has merely to pour the nitro-glycerine into the hole, pour a little water upon the top of it, insert the mining fuse so that the percussion cap at one extremity enters the nitro-glycerine, apply the match to the other extremity, and retreat under cover. In a few seconds the charge explodes, and the work is done. But whilst the efficiency of the crude material was not doubted, there were by far too many fatal evidences of its dangerous and treacheous character.

It has been generally considered that the principal defect of nitro-glycerine in a pure state as a blasting agent arises from its liquid nature, and consequent tendency to leak out of the tins in which it is usually transported. In this state it is very susceptible to detonation; a small portion absorbed on blotting-paper readily explodes if struck with a hammer, and a slight blow on a portion of the liquid which had accidentally escaped might be followed by a disastrous explosion. In order to reduce this source of danger, Mr. Alfred Nobel, the celebrated chemist, was led to make various experiments with mixtures of nitro-glycerine and absorbent substances, and he ultimately discovered that a pasty preparation of nitro-glycerine could be made by which the danger was to a great extent obviated, without much sacrifice to the explosive property of the crude oil. This preparation, to which Mr. Nobel gave the name of Dynamite, was first brought before the public in 1867, and when carefully manufactured it undoubtedly constitutes one of the safest, most powerful, and most convenient explosive agents applicable to industrial purposes. Shortly after its discovery it came into great request as a mining agent, and its manufacture has recently been established on an extensive scale in this country.

The works of the British Dynamite Company, who manufacture the material in this country, are in Ayrshire, on the sea coast between Ardrossan and Irvine, and comprise a chemical works and a nitro-glycerine or dynamite factory, 150 yards apart, and separated from each other by a large sandbank, partly natural, partly artificial, so that danger is reduced to the minimum. The explosive oil is made by subjecting the ordinary glycerine of commerce to the action of a mixture of nitric and sulphuric acids. The result is an oily fluid, which is subsequently purified by being submitted to various washing processes. The manufacture, to a great extent, is carried on in a way similar to that which is described in chemical books, with these differences—that the apparatus is much larger, the purifying and cooling processes somewhat different, and the operations facilitated by certain appliances which enable the manufacturer to produce the largest quantities with the least expenditure of time and labour. Reservoirs of sulphuric and nitric acids are established on a high level, the former being blown up through a leaden pipe by means of compressed air, the latter taken up an inclined railway in carboys. A stationary steam-engine at the bottom of the incline hauls up the trucks and drives a fan, by which compressed air is made available for use all over the factory. The acids are first thoroughly mixed in a tank, which having been placed upon the staging, immediately above the incorporating vessel, the acid charge is allowed to run through a filter into the latter. A charge of ordinary trade glycerine is next placed upon the staging, and allowed to pass through a filter into a pipe which communicates with the bottom of the incorporating vessel, at a point where it meets a compressed air-pipe. The action of the latter blows the glycerine into the mixed acids in a finely divided state, and as the glycerine is of lighter specific gravity it rises gradually through the mixture, and is thus exposed to the full effect of the acid. The requisite precautions are taken to prevent explosion during the process. The process having been completed without accident, the charge is run from the incorporating vessel through a tube into a tank in the separating house. Here it is allowed to settle, and the explosive oil being of lighter specific gravity than the refuse acid rises to the surface, and is ladled by an earthenware spoon into a trough, from which it runs into a cistern in the first washing-house. The refuse acid is subsequently examined, to ascertain if it contains any dangerous amount of remaining nitro-glycerine, as it is sometimes difficult to remove the whole of the oil by the ladling process. If this is found to be the case the refuse is run off into a drowning well; if not, it is run into a tank, from which it is subsequently re-distilled. The nitro-glycerine undergoes a thorough washing with cold water in the first washing-house, the contents of the vessel being violently agitated by jets of compressed air; it is then run off into a second washing-house, in which it is again re-washed in a mixture of carbonate of soda and water, agitated by jets of compressed air. This alkaline solution removes all traces of free acid, and the crude oil is now ready for the chemical tests as to purity. It is beyond the scope of this article to enumerate these in detail, but we may mention that they include an ingenious application of the spectroscope to detect salts of lime, chlorates of soda, or glucose in an impure state.

The conversion of the nitro-glycerine into dynamite is the next process. No. 1 quality, according to Mr. Nobel's evidence, is produced by mixing nitro-glycerine with inert substances not explosive of themselves, which are of a very porous nature; for example, porous silica or fossil silica, called in Germany "kieselgühr." This porous earth is said to absorb about three times its weight of nitro-glycerine. In No. 2 the explosive oil is mixed with the elements of gunpowder, minus the sulphur—that is, with rapidly-burning substances which by themselves do not form an explosive. "Kieselgühr" is an earth formed of minute fossil shells, and thus very rich in silica. It is delivered at the dynamite works as it is dug from the ground in Germany, and presents the appearance of a yellow burnt lime. The first process it undergoes is calcining, by which the little iron it contains is converted into peroxide, and it is the presence of this peroxide of iron which gives to No. 1 dynamite its red colour. It is then crushed between rollers to a fine powder, and subsequently sifted in a machine for the purpose. A proper charge, 25 parts, is then placed in a movable wooden tank, which is run under the tap of a vessel containing nitro-glycerine, and the requisite amount, 75 parts, of the latter is allowed to pour over the earth. The wooden tank is then removed to a kneading-house, where the mixture is worked up by hand into a species of dough, and then rubbed over a sieve until it passes through. The result is dynamite—a loose, moist, readily-mouldable powder of a pink or buff colour, which is made up into cartridges of 1 oz. to 4 ozs. each. The operation, a mechanical one principally, consists in forming the paper destined for the covering of the cartridge into a cylinder in the die, then in admitting the precise charge to fall from the hopper, and, lastly, in pressing the cartride into shape by the lever. The cartridge machines are easily and expeditiously worked, and, according to Mr. Nobel, they are made so that in case there should be a surplus of nitro-glycerine the machine itself will eliminate it. The chief danger to be experienced from dynamite cartridges is subsequent exudation of the oil during transport and storage, owing to the presence of an excess of nitro-glycerine. But Mr. Nobel claims that these machines are so regulated as to pressure that all surplus nitro-glycerine, if any, is squeezed out during the process of cartridge making. The manufacture of No. 2 dynamite is carried out in a similar manner, with the exception that about 71 parts of nitrate of potash incorporated in a mill with about 10 parts of charcoal, with a little paraffin added, take the place of the "kieselgühr," and are mixed with 18 parts of nitro-glycerine. The result is a black powder, less moist, and, consequently, more friable than No. 1. The cartridges of No. 2 are made up in a similar manner.

With regard to the general question of safety, Col. Younghusband's committee remark that the safety of nitro-glycerine substances, partaking of the character of dynamite, may be said to depend on three conditions—(*a*) the original purity of the nitro-glycerine; (*b*) the efficient character of the absorbing agent; (*c*) the non-liability of the substance to explosion under such circumstances of rough handling friction, or concussion as it might meet with. Points connected with the purification of nitro-glycerine can only be decided by the experience derived from a long series of experiments extending over a considerable time, but they are of opinion that the stable character of such a material as dynamite may be demonstrated by a "heat test," somewhat analogous to that laid down for gun-cotton—about five minutes' exposure of a given quantity to a heat of 160° Fahr.—to ascertain whether any acid reaction should appear to indicate a change in chemical constitution. With regard to the second condition—the efficient character of the absorbing agent—the points to be determined are whether the nitro-glycerine will exude if exposed either to a damp or heated atmosphere such as might be met with in a quarry magazine or in the hold of a ship. To test this the committee recommended that some cartridges in their paper wrappers and in an unfrozen state should be exposed for 14 days to an atmosphere saturated with moisture produced by the spontaneous evaporation of water in a confined space, temperature being not less than 50° Fahr. To ascertain whether exudation will occur in a heated atmosphere some cartridges in their paper wrappers should be exposed for 24 hours in a confined chamber to a heat not exceeding 100° Fahr. or less than 90° Fahr. In either case exudation should be shown by drops or globules on the outside of the paper in which the substance is wrapped, but an appearance of exudation inside the wrapper should not be sufficient to condemn the sample. With regard to the third condition, the committee point out that the sensativeness of nitro-glycerine compounds to concussion appears to depend on the sharpness rather than the energy of the blow, and the comparative safety imparted to nitro-glycerine by its admixture with "kieselgühr," or other absorbent, appears to depend on the difficulty of submitting the resulting soft yielding mass of dynamite to a really sharp blow. But the results obtained with a small quantity do not afford any true criterion of the safe or hazardous character of the material in actual use, and to submit to systematic trial a sufficient quantity of the mateial is impracticable from the extreme violence of the explosion when brought about. Under these circumstances, the committee have been unable to devise any simple and practical test by which the sensativeness of the material, when subjected to concussion, may be determined.

THE MARINE ENGINEERS' AGENCY FOR MUTUAL ASSISTANCE IN OBTAINING EMPLOYMENT: A MEDIUM OF INTERCOMMUNICATION FOR STEAMSHIP OWNERS AND ENGINEERS.—About two years ago a number of marine engineers associated themselves with the view of mutual assistance in obtaining employment without the disagreeable necessity of having to call from office to office—oftimes a source of annoyance to the employer, and of repeated and wearying disappointment to the applicant. Thus was established the "Marine Engineers' Agency"—the only object of combination really being the promotion of the interests both of employer and the employed. This agency consists of two classes of members—ordinary members and members of council. No person is eligible to become an ordinary member who has not served five years apprenticeship, or who has not worked for the same period before the age of 23, in an engineer's shop, and who has not been three months at sea as an engineer, and on the ship's articles, and who does not produce papers to certify these facts. While it is absolutely necessary that the principles of this agency shall be maintained in their integrity, and none but skilled mechanics of the highest character, and holding the necessary certificates, be admitted as ordinary members, it shall not be imperative that the members of council shall be, or shall have been, marine engineers, but any person desirous of promoting the interests of the agency, and who from his knowledge, position, and influence shall be likely thus to benefit the agency, is eligible for election as member of council. The members of council consist—firstly, of life members, that is to say of such gentlemen who contribute at one time a sum of not less than five guineas to the funds of the agency; secondly, of annual members, whose subscription is one guinea per annum; thirdly, of honorary members, who shall, from their services rendered to the agency, or from some other fit cause, be deemed worthy of election. Several of the leading consulting marine engineers have signified their intention of supporting this institution by becoming members of council. With a view to benefit the members of the agency by the diffusion amongst them of information essential for their knowledge, endeavours are being made to establish a library of practical works for reference—this library not to be in any sense a lending library, but merely a library of reference for members whilst ashore. Donors of books whose collective value is 5*l.* and upwards are thereby eligible for election as life members of council. Mr. N. P. Burgh, C.E., is taking the initiative in this matter by a donation of his valuable works on marine engineering subjects. The officers of this agency consist of a secretary, treasurer, and president. Any member leaving his employment, as soon as convenient, writes his name and address in a book kept for that purpose. Any member discharged for misconduct bringing him into disgrace, has his name erased from the books of this agency, and upon no consideration is he reinstated a member. Any member who has been admitted into this agency under false pretences immediately has his name erased from the books, and upon no pretence is he at any future time allowed to become a member. In the event of any member having the misfortune to be shipwrecked, thereby losing his clothes and other effects, he is entitled to such gratuity from the funds of this agency as shall be fixed by a special meeting of the members. All expenses are borne by the marine engineers thus associated. This agency has just been removed to No. 14, London-street, E.C. All applications to the secretary, Mr. M. A. Soul, will meet with prompt attention. The registry of unemployed engineers can be seen between the hours of 10 A.M. and 4 P.M. daily.

STAR LIFE ASSURANCE SOCIETY,—The report of this society, as presented to the shareholders at their annual meeting on March 1, was a most satisfactory one, and possesses some features deserving of notice. Before speaking of the new business acquired during the past twelve months, we must shortly allude to the claims paid by the society during that period. We are informed that 206 policy holders died during the past year, whose assurances, with bonus additions, were in the aggregate 92,472*l.* 7s. 10d., which, although a large sum, fell considerably within the amount calculated for under the society's tables. It is fair to assume that the class of claims under these assurances which are there recorded as having fallen in would as a rule be of persons who would not have been able to save anything like the figure here named, and doubtless but for the provision thus secured many a widow and fatherless child would now be suffering it may be the pangs of hunger, in addition to the cold sympathy of the world; and that we have here, if evidence were wanting, illustrations of the blessings of life assurance the effects of which it is impossible to overestimate. It is worthy of notice, also, that the Star Life Office has paid away during the thirty-one years it has been in existence no less than 1,140,151*l.* in claims, or at the rate of 36,779*l.* per annum. We pass on to mention their new business. The directors had under their review 1833 proposals, for 672,915*l.* 11s., but of this number only 1502 were completed, for 511,240*l.* 11s., and producing a net yearly income of 14,552*l.* 14s. 6d.; the remainder, 331, were declined, or had not been carried out at the closing of the accounts at Christmas last, the total income from premiums, after allowing for re-assurance, was 164,608*l.* 2s. 9d. The progress of the prosperity of the society can be seen in the fact that their new business shows an increase of 244 policies, assuring 103,905*l.* 11s., with an annual premium account of 2758*l.* 19s. 3d. as compared with the previous year. The body and class of persons who would especially patronise this society is a powerful one, whose confidence in the stability of their office is exhibited by the undoubted appreciation of the manner in which their affairs are managed by a body of gentlemen whose status in society is a guarantee that in all its branches the utmost care and caution are exercised, and if the present cautious system is strictly adhered to the future success of the company is more than a certainty. The accounts, as prepared in accordance with the regulations of the Life Assurance Companies Act, 1870, are clearly and concisely drawn up, and the merest tyro in book-keeping could not fail to make them out. It will there be seen that, after payment of the claims, bonuses, cost of management, &c., the directors have been able to add the sum of 65,529*l.* 2s. 10d. to the Assurance and Annuity Fund during the past year, which fund now stands at 1,211,115*l.* 13s. 5d.

A NOVEL STEAM-ENGINE.—Sir Gilbert Clayton East is the owner of a steam-launch into which has been recently introduced a steam-engine of a very novel and ingenious character. The launch was built, in 1847, by Messrs. Forrest, of Limehouse; and its engines were supplied by Mr. John Penn, of Greenwich. In the first instance the vessel was fitted with a double propeller, which was afterwards discarded for a single screw. The cabin accommodation of the launch being found somewhat too small, the owner decided on removing the engine and placing it nearer the stern, but the space there available was so small that it was impossible to employ driving power of the ordinary construction. Messrs. Penn advised that a newly-patented engine invented by Mr. Willans should be tried, and Sir Gilbert consented. The launch yesterday made a trial trip up the river, starting from Teddington Lock about half-past eleven. The new engine, which worked admirably, deserves description from the novelty and ingenuity of its form. It works up to 40-horse power, but is extremely small. It stands only 15 inches above the floor-plates of the engine-room, and is 9 inches wide by 22 inches long. One of the most prominent of its many advantages is the absence of that disagreeable throb which is usually one of the accepted nuisances of a vessel of any kind when propelled by steam-power. It appears to be peculiarly fitted for yacht use, since the machinery is all inclosed in a small mahogany box, and there is no splashing of oil, nor any possibility of tearing or soiling ladies' dresses by exposed machinery. The secret of its extreme smallness and its great relative strength lies in the perfect simplicity of its parts. The complicated arrangement of slides and eccentrics ordinarily employed is here dispensed with, the only working parts being three pistons, three conducting rods, and one three-thrower crank-shaft. It is extremely quick in starting, in stopping, and in reversing. In an earlier trial it has been known to make 13 miles in 75 minutes, travelling from Limehouse to Erith against a slack tide. The engine was constructed by Messrs. Tangye Brothers, of Birmingham, and was fitted in its place by Messrs. Penn, who also supplied the boiler and propeller.

SULPHATE OF SODA—SULPHATE OF POTASH.—The Messrs. MCDOUGALL BROTHERS, Manchester and London, manufacturing chemists, have patented some improvements in the manufacture of sulphate of soda and of sulphate of potash. In the manufacture of sulphate of soda and of sulpate of potash by the direct action of sulphurous acids upon the chlorides of sodium and of potassium great expense and trouble are caused by the usual process of moulding and breaking the moulded salt into lumps, so that when placed in the saturation cylinders a free passage is allowed for sulphurous acid gas. This invention consists in maintaining the salt in motion whilst exposed to the action of sulphurous acid gas by the use of suitable mechanical means, so that the salt may be employed in a loose state, and thus save the trouble and expense of preparing lumps, and also cause a more rapid completion of the decomposing action. They also introduce steam in a superheated state during the process; by this means a more rapid action takes place, and the necessary temperature is more easily kept up.—Mr. W. HUNT, of Castleford, Yorkshire, manufacturing chemist, has also patented some improvements in apparatus for the manufacture of sulphate of soda and sulphate of potash. This invention has reference to that process of manufacturing sulphate of soda and sulphate of potash, in which chloride of sodium or chloride of potassium is decomposed by a mixture of sulphurous acid gas, air, and steam; and the said invention consists in erecting the chambers in which the chloride is decomposed immediately over the pyrites burners. The hot gases from these burners pass out through the arches of the burners, and travel under and in contact with the floors of the chambers. By this invention the bottoms of the chambers are maintained at a high temperature, which is communicated to the gaseous mixture as it circulates through the chambers, and the requisite high temperature is preserved.

VENTILATION.—Mr. D. M. MORRISON, of Newcastle-upon-Tyne, civil and mining engineer, has patented an invention which refers to ventilators, fans, and blowing-machines, and consists of a casing having one or more inlets and outlets, and of blades made to revolve in the casing, so as to draw in air at one part and discharge it at another part. The provisional specification describes the construction of blades so that they widen out towards their periphery, and are slightly curved in a forward direction; also the making of the inlet or inlets of funnel shape or conical; also where there are inlets on both sides of the casing the employment of a disc in the middle of the fan to prevent the opposite currents interfering with each other.

STEAM-BOILERS.—Some improvements have been proposed by Mr. ALFRED DE PINDRAY, of Victoria-street Westminster, in the form and arrangement of steam-boilers and of tubes for the same for the rapid production of steam for prolonging their durability without the risks of explosion often arising from the irregular distribution of heat, also for effecting economy of fuel. The invention consists of forming and fixing conical tubes in boilers in the reverse manner to that usually adopted to augment the consumption of the gases developed from the fuel, and in arranging chambers at portions of the boilers in which full expansion of the gases can take place before they ar utilised for heating purposes.

SALT.—Mr. T. BARROW, of Rock Ferry, has patented an improvement in furnaces to be used under pans for the manufacture of salt, which consists in fitting a furnace under the pan, consisting of a circular, oval, or other suitable shaped flue, at the bottom of which is laid a tramway or line of rails on which run a train of fuel receptacles which form the furnace. The second part of this invention relates to improvements in pans for boiling or concentrating brine or solution used in the manufacture of salt, and consists in making the bottom of such pans corrugated. The third part of this invention relates to an apparatus for cutting the blocks of salt into slices, and then crushing them. The fourth part of this invention relates to an improved apparatus for sacking salt after it has been crushed.

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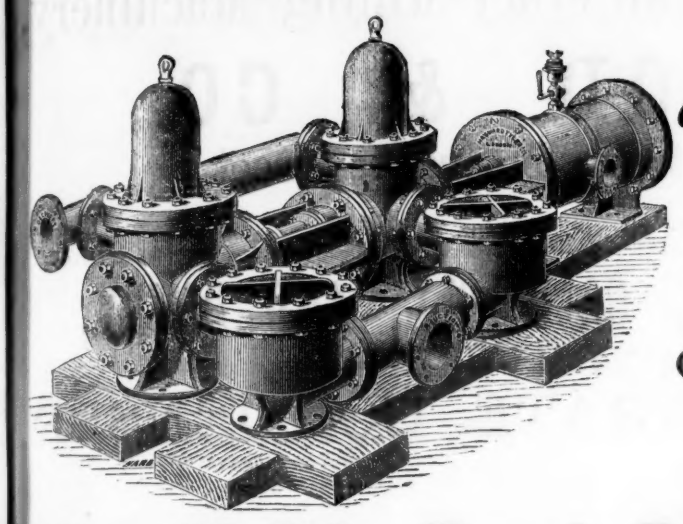

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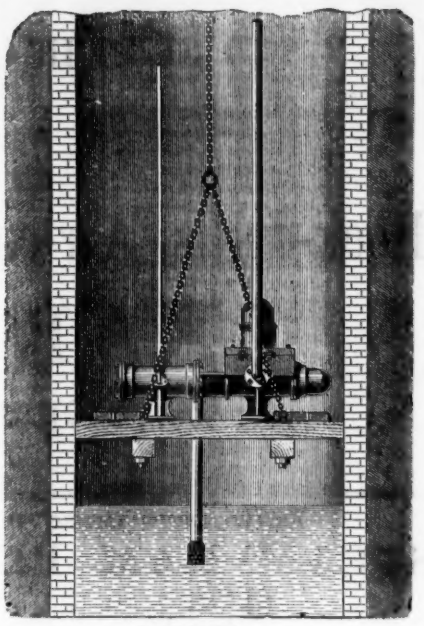

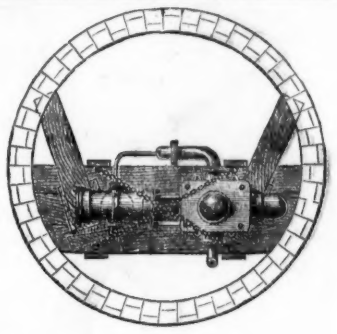

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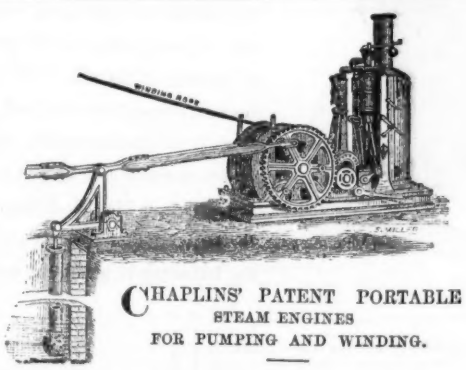

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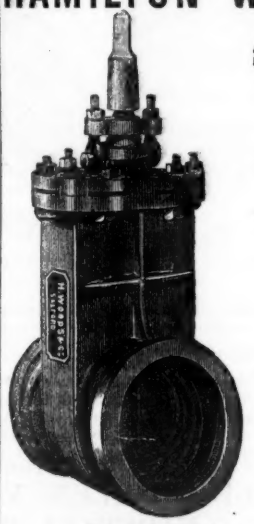

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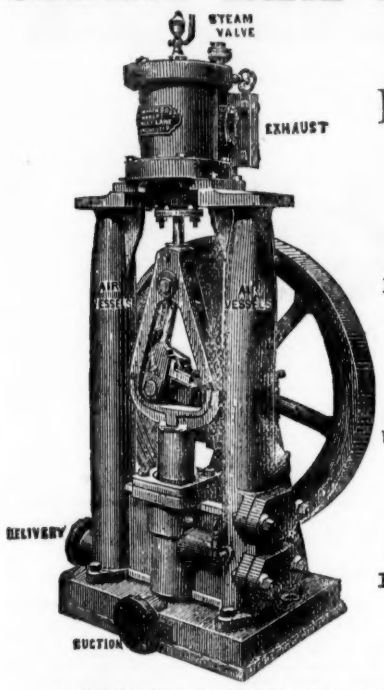

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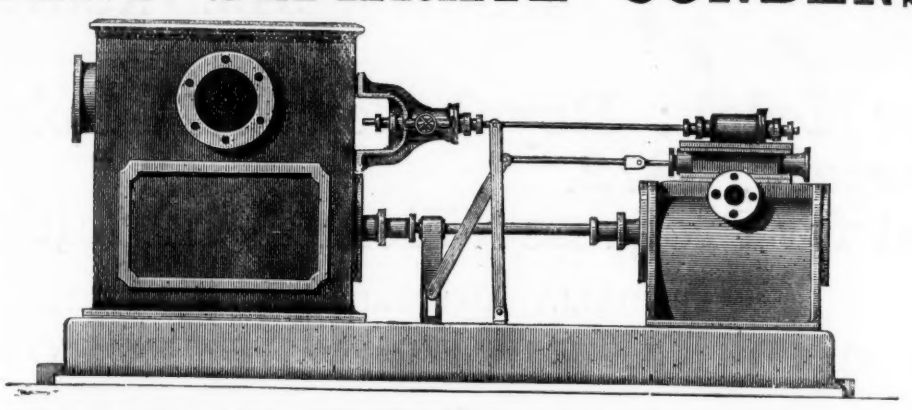

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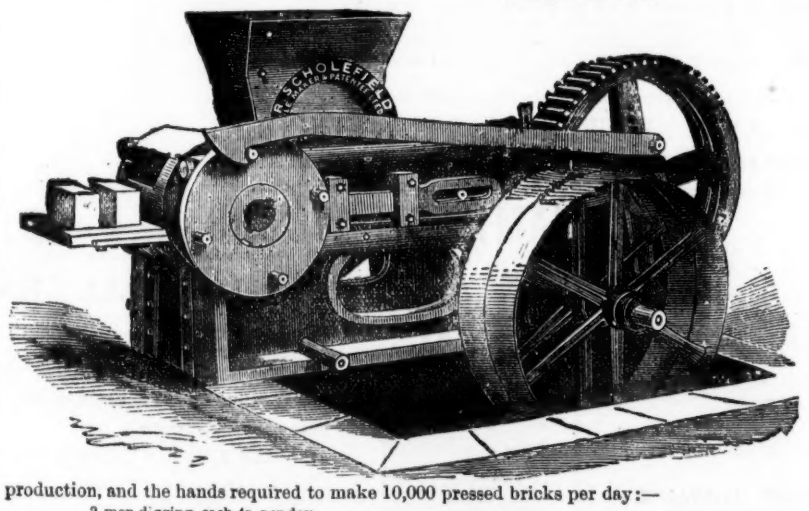

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